

**MM-1100
RECORDER/REPRODUCER**

**DESCRIPTION
INSTALLATION
OPERATION
MAINTENANCE**

**AMPEX CORPORATION
AUDIO-VIDEO SYSTEMS DIVISION**

Prepared By

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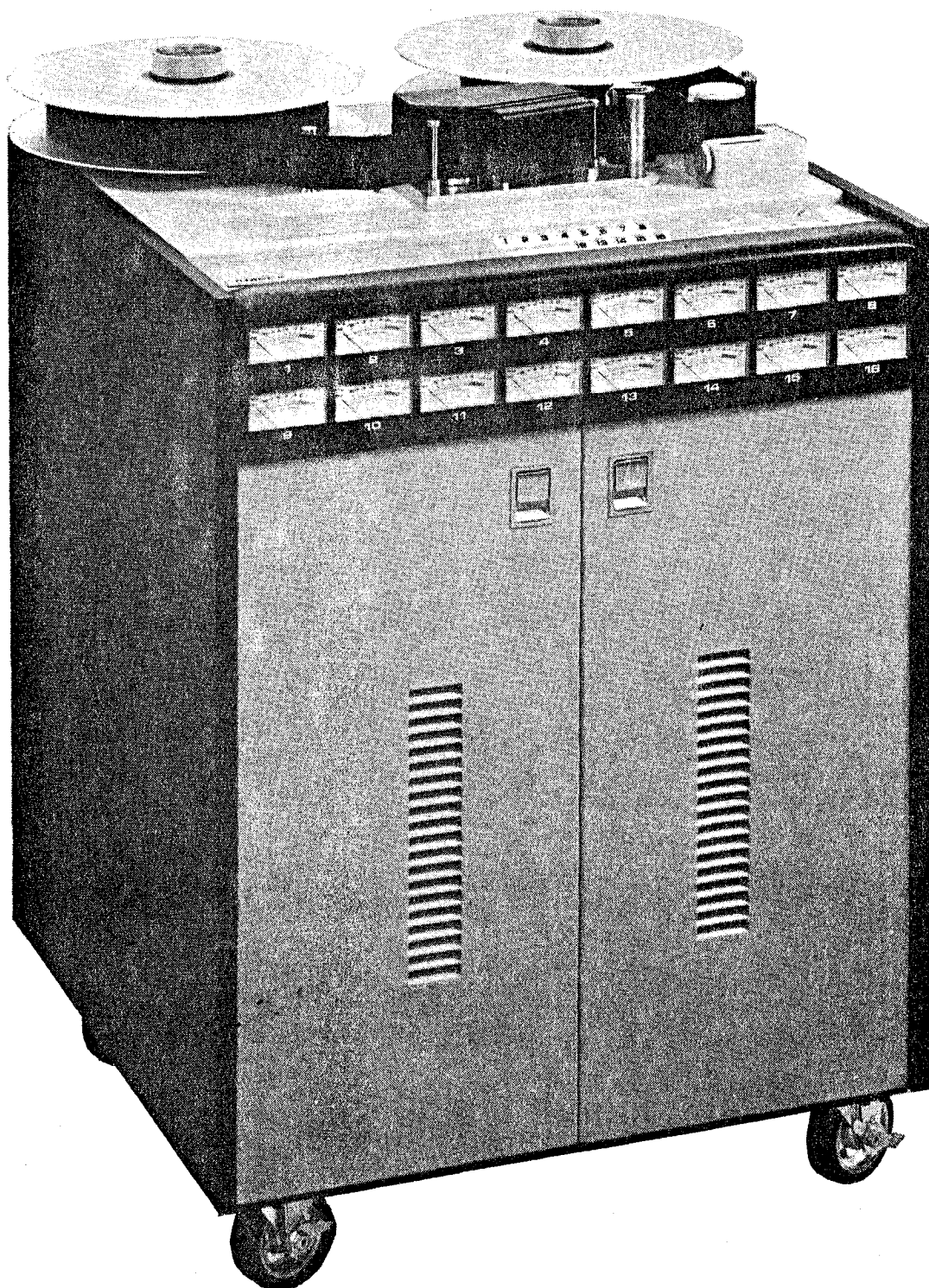
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Master Maker 1100 Recorder/Reproducer, 16-Channel Version

DESCRIPTION

GENERAL

This manual contains installation, operation, and maintenance instructions for the Ampex Model Master Maker 1100 Tape Recorder/Reproducer, Ampex part no. 4010210. The standard model MM-1100 provides 16 channels of audio recording/reproducing capabilities, using 2-inch magnetic tape on reels up to 16 inches in diameter. Eight-channel and 24-channel recorder/reproducer systems are available on special order. Any machine may be converted to an alternate configuration (e.g. 16 to 24-channel) by installing a conversion kit. The MM-1100 provides the capability of recording on any or all 16 channels simultaneously, or of monitoring a previously recorded channel while recording in synchronization on additional channel(s). The selective synchronization (SEL SYNC*) feature is enabled by using the record head(s) of the prerecorded channel as playback head(s).

The MM-1100 recorder/reproducer consists of a tape transport assembly; a transport control assembly, a frame assembly; a motor drive amplifier assembly; a head assembly; four electronics assemblies (for 16-channel systems); a control box assembly; a meter panel assembly; two power supplies; a fan assembly; an external connector panel assembly; an input/output adapter panel assembly; and a circuit breaker assembly. Connectors are used extensively between units to allow easy removal of components and assemblies.

TAPE TRANSPORT ASSEMBLY

The tape transport assembly, Figure 1, consists of supply and takeup reel assemblies; a capstan drive assembly; a capstan pinch roller assembly; a tension sensor assembly; an end-of-tape arm and housing assembly; a tape lifter assembly; and an optional tape timer assembly; Also mounted on the tape transport, but not considered part of the tape transport, are the erase, record, and reproduce heads comprising the head assembly.

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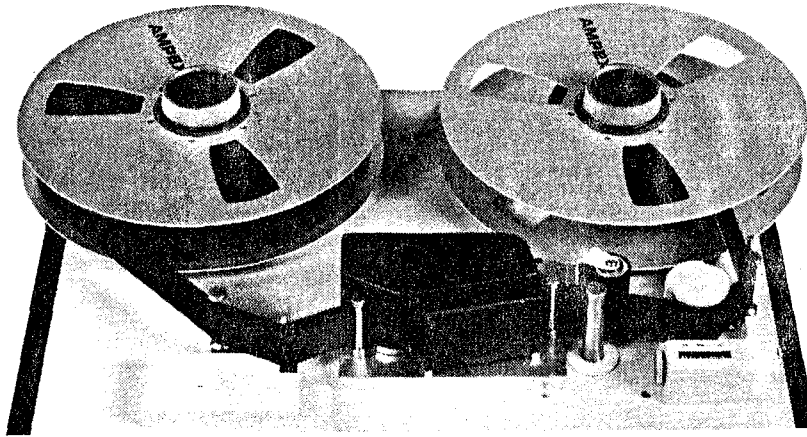


Figure 1. Tape Transport Assembly

SUPPLY AND TAKEUP REEL ASSEMBLIES

The supply and takeup reel assemblies each consist of a split phase, four-pole ac torque motor and brake assembly. The motors drive the tape reel turntables. A motion sense assembly is mounted on the bottom of the supply reel drive motor and shares the turntable shaft. These assemblies can be removed through the top of the transport deck for servicing.

CAPSTAN DRIVE ASSEMBLY

The capstan drive assembly consists of a dc servo-controlled motor and a tachometer wheel. The shaft of the motor is the capstan for the tape transport. The tachometer wheel assembly consists of a pickup coil and inner and outer tach (gear) wheels mounted on the motor shaft and housing. The use of both inner and outer tachs minimizes flutter introduced by tach irregularities.

CAPSTAN PINCH ROLLER

The capstan pinch roller consists of a solenoid-operated, shaft-mounted arm. The arm supports a rubber pinch roller fitted with ball bearings at each end of the pinch roller shaft. An adjustable pressure spring is used to maintain the necessary force of the pinch roller against the capstan.

TENSION SENSOR ASSEMBLY

The tension sensor assembly consists of two selenium photovoltaic cells and an incandescent lamp mounted on a fixed bracket. The three active components are wired to a connector plug

that interconnects with the transport harness. A moving window is fixed to a tension arm in the tape path which passes an amount of light proportional to the tape tension from the lamp to the photocells.

END-OF-TAPE ARM

The end-of-tape arm is contained in a housing and consists of a spring-loaded tension arm assembly fitted with a tape guide at the free end. The post to which the tension arm is attached extends through the transport chassis and is mechanically coupled to a dashpot to dampen the spring-loaded effect. The tension arm post is also equipped with an actuator that trips a microswitch which signals that there is no tape pressure against the tension arm.

TAPE LIFTER ASSEMBLY

The tape lifter assembly is a solenoid-operated, spring-return pivoted assembly. The tape lifter pins extend up through the head assembly mounting block and are moved forward of the head assembly when the solenoid is actuated. Unless defeated by the operator, the tape lifters function during the fast forward and rewind modes.

TAPE TIMER ASSEMBLY (OPTIONAL)

The tape timer assembly consists of a tape-driven idler assembly attached to a mounting boss. The timer idler drives a gear train arrangement, which, in turn, drives a mechanical time counter. The counter indicates tape travel time in hours, minutes and seconds. If the tape timer option is not used, a fixed post is fitted in its place.

TRANSPORT CONTROL ASSEMBLY

The transport control assembly is an enclosed chassis with a hinged lift-up cover, which contains two separate printed circuit board assemblies and an extender board. The transport control board and the capstan servo board plug into 56-pin connector receptacles J1 and J2, respectively. The extender board plugs into spare receptacle J3. The board receptacles are hard-wired to a connector cable harness that interconnects with the transport assembly, the electronics assembly, the remote control connector on the input power panel, and the tachometer. The transport control assembly is mounted to the rear of the meter panel assembly, adjacent to the control box assembly.

MOTOR DRIVE AMPLIFIER ASSEMBLY

The motor drive amplifier (MDA), is a completely enclosed chassis that mounts on the right side of the rear panel. The MDA assembly contains a printed circuit board mounted on the chassis with five heatsinks for power transistors. A chassis connector is provided for interconnection of power and control signals. Three separate MDA's are enclosed, two for the reel motors and one for the capstan motor.

HEAD ASSEMBLY

The head assembly (Figure 2) contains three 16-channel head stack assemblies: the erase head, the record head, and the reproduce head. The head assembly accepts 2-inch wide recording tape to provide 16-channel record, reproduce, and erase capabilities. The record and reproduce head stacks are magnetically shielded with laminated mu-metal. A hinged head shield cover is block-mounted in front of the record and reproduce heads. In addition, two precision tape guides are mounted adjacent to the erase head on one end and the reproduce head at the other end. The record and reproduce heads are identical, and are of a design which provides Sel-Sync response comparable to that of conventional reproduce heads.

ELECTRONICS ASSEMBLIES

Four electronics assemblies are required to make up the total complement of 16 channels. Each electronics assembly (Figure 3) comprises four channels of the 16-channel recorder and

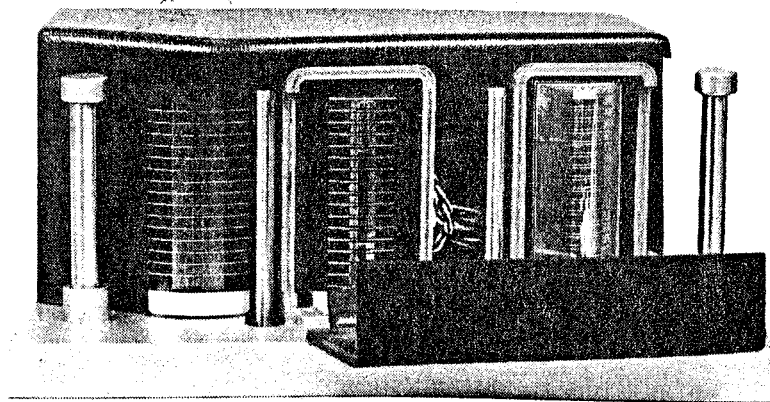


Figure 2. Head Assembly

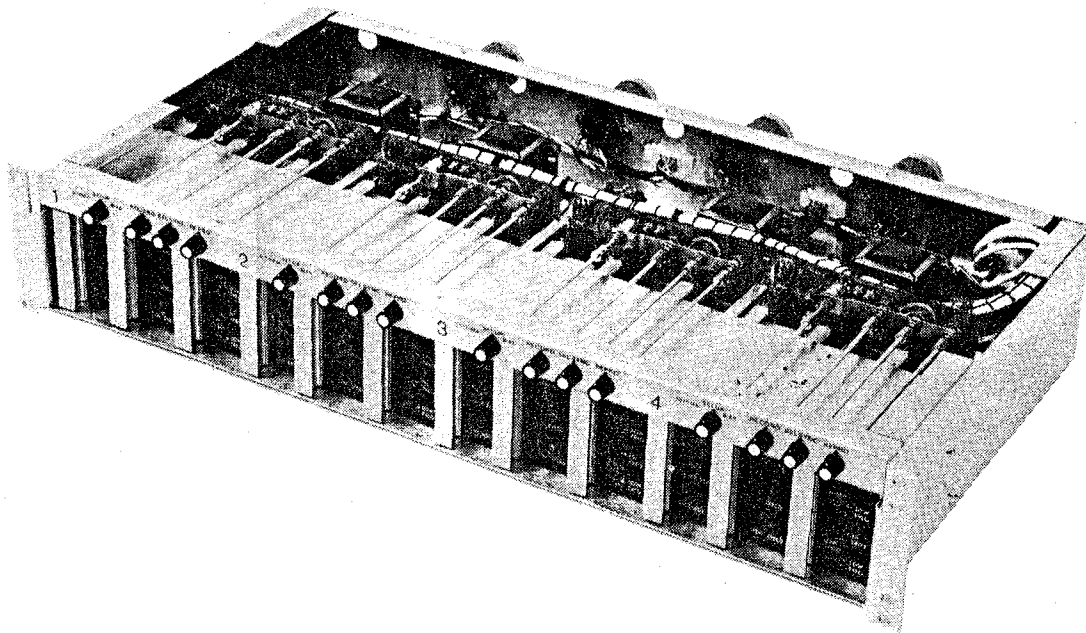


Figure 3. Electronics Assembly

consists of four audio switching printed circuit boards. Each audio switching board contains three 24-pin printed board receptacles. The bias amplifier, record amplifier, and reproduce amplifier boards plug into the receptacles on the audio switching board. A 30-pin connector connects each audio switching board with the rest of the electronics. Three potentiometers and a switch on each audio switching board are mechanically coupled by shaft extenders to the front panel to provide switching and adjustment of Sel-Sync, reproduce, and record levels. Normally, knobs are provided for these controls. However, if desired, the knobs may be removed and the exposed shafts recessed for screwdriver adjustment only. Protrusion of the shafts is governed by adjusting the shaft coupler.

Each record and reproduce board contains a 10-pin printed circuit board receptacle for a plug-in equalization board. The equalization boards plug in at right angles to the record and reproduce boards so that the board adjustment controls are accessible at the front panel of the electronics assembly. The rear panel contains all necessary input/output connectors. Each electronics assembly (4 channels) is fitted with an individual 2A slow blow fuse for protection of the 39-V supply, located on the rear of the assembly. A line bridging transformer is provided and is inserted in the INPUT ACCESSORY socket on the rear panel of the electronics assembly.

CONTROL BOX ASSEMBLY

The control box assembly (Figure 4) is a removable assembly that doubles as a remote control unit. The control box contains the controls and indicators for all operating functions of the recorder. There are 16 SAFE READY rocker switches which select the particular channel(s) to record on or reproduce from. Other control box assembly switches are: SEL SYNC/REPRO, INPUT MON/NORM MON, TAPE SPEED 15/30, LIFTER DEFEAT, RECORD, PLAY, REWIND, FAST FORWARD, and STOP. When the control box assembly is used as a remote control unit, it is connected by a cable assembly to the remote control connector on the input power panel on the rear of the recorder.

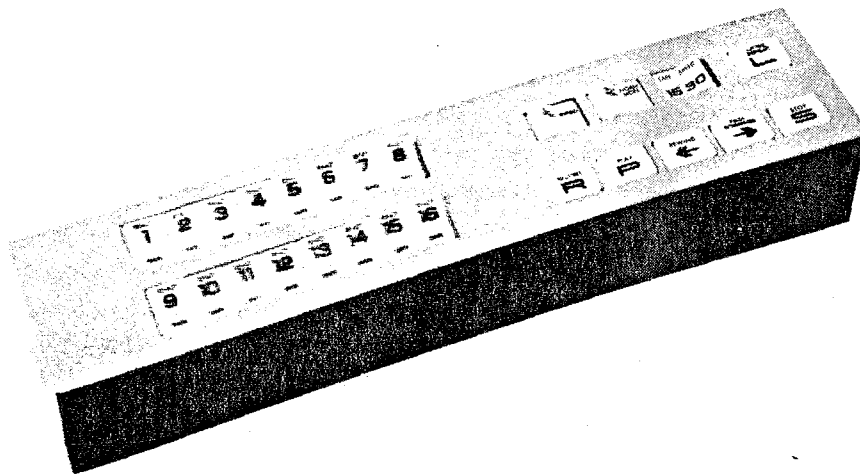


Figure 4. Control Box Assembly

METER PANEL ASSEMBLY

The meter panel assembly is comprised of 16 individual vu meters, one meter per channel. The meter panel tilts into three different positions, the last of which is with the meters tilted down for lamp replacement. A cable harness provides interconnection to the electronics assembly.

POWER SUPPLIES

A 15/27-volt power supply and a 39-volt power supply are mounted on the rear panel of the recorder, with the 39-volt supply on top. Basically, each power supply consists of a transformer, filter capacitors, transistors with heatsinks, a regulator board, and output connectors. In addition, the 39-volt supply contains a bias/erase oscillator for the electronics. The main difference between the units is the regulator printed circuit board which plugs into the power supply chassis.

SPECIFICATIONS

Specifications for the MM-1100 are presented in Table 1.

Table 1. Specifications

PARAMETER	SPECIFICATION
Tape Widths	1 inch for 8-track systems 2 inch for 16 or 24-track systems
Tape Speeds	15 and 30 in/s
Reel Size	NAB hub up to 16-inch diameter
Inputs	20 kilohms balanced input. Accepts line levels from -17 dBm to produce recommended operating level.
Outputs	600-ohm load balanced or unbalanced with nominal output level of +4 dBm and maximum output of +27 dBm, nominal.
Equalization	Automatically switched with speed change, using NAB plug-in equalization circuits [IEC (CCIR) plug-in circuits available on order].
Electronics	All electronics are solid-state. Plug-in printed circuit boards for record, reproduce, equalization, and bias amplifiers.

Table 1. Specifications (Continued)

PARAMETER	SPECIFICATION
Power Supplies	39 vdc regulated (electronic system) +27 vdc, +15 vdc and +5 vdc (servo and control system)
Electronic Overload Margin	Record Amplifier: Overload greater than 28 dB above normal operating level
Overall Frequency Response, Sel-Sync and Reproduce Modes	30 in/s: ± 2 dB, from 50 Hz to 18 kHz 15 in/s: ± 2 dB, from 30 Hz to 15 kHz
Signal-to-Noise Ratio Using Ampex 406 tape or equivalent at 15 or 30 in/s Using Ampex 404 tape or equivalent at 15 or 30 in/s	8 or 16 channels, 63 dB; 24 channels, 58 dB; peak record level to unweighted (30 Hz to 18 kHz) noise; includes bias, erase, and reproduce amplifier noise. (Peak record level corresponds to a tape flux of 520 nWb/m.) 8 or 16 channels, 60 dB; 24 channels, 55 dB; peak record level to unweighted (30 Hz to 18 kHz) noise; includes bias, erase, and reproduce amplifier noise. (Peak record level corresponds to a tape flux of 370 nWb/m.)
Third Harmonic Distortion	30 or 15 in/s: 1000 Hz 1. Using Ampex 406 tape or equivalent, $\leq 1.0\%$ at recorded flux level 3 dB above 185 nWb/m (Ampex operating level). 2. Using Ampex 404 tape or equivalent, $\leq 1.0\%$ at recorded flux level of 185 nWb/m (Ampex operating level).
Even Order Harmonic Distortion	At 1000 Hz, $\leq 0.3\%$ at a recorded level corresponding to 6 dB above a tape flux of 185 nWb/m.
Bias/Erase Frequency	150 kHz $\pm 2\%$
Erase Depth	At 1000 Hz, peak record level signal erased to -75 dB minimum on channel(s) selected

Table 1. Specifications (Continued)

PARAMETER	SPECIFICATION
Flutter	15 and 30 in/s: 0.08% peak weighted per ANSI S4.3/DIN 45507, in a band 0.5 to 200 Hz, while reproducing a 3150 Hz signal. (0.08% NAB unweighted; 0.1% peak unweighted.)
Crosstalk	-50 dB minimum for 8 or 16 channels at 500 Hz -45 dB minimum for 24 channels at 500 Hz
Timing Accuracy	±0.1% (1.8 seconds in a 30-minute record time) for tape recorded, rewind, and reproduced on the same unit
Tape Position Index	Reads hours, minutes, and seconds, with repeat accuracy of ±0.1% at 15 ips.
Tape Speed Accuracy	Within ±0.05% from beginning to end of reel. Tape speed unaffected by line voltage or line frequency fluctuations (per NAB Standard on Magnetic Recording and Reproduction, 1965, Section 2.02.01)
Reference Oscillator	±0.01%, 0 degrees C to 65 degrees C
Heads	8, 16, and 24 tape stacks are non-adjustable precision-mounted
Start Time	Full speed within 0.5 seconds at 15 ips
Rewind Time	2.0 minutes for 10.5-inch reel of 1.5-mil tape
Power Requirements	105 to 125 vac, 48 to 62 Hz MM-1100-8 8.0 kVA maximum MM-1100-16 1.0 kVA maximum MM-1100-24 1.2 kVA maximum } without accessories

INSTALLATION

EQUIPMENT SITING

The installation site for the MM-1100 should be free of strong electromagnetic and electrostatic fields which could interfere with or degrade system operation. The environment should be reasonably dust-free; ambient temperature should be from 32 to 122 degrees F (0 to 50 degrees C); relative humidity should be 10 to 90 percent; and no less than six inches of ventilation space should be left behind the machine. The system requires 28 by 27 inches of floor space, plus access and reel clearances.

UNPACKING

Upon receipt, examine the shipping crate for any signs of damage. Unpack the equipment and inspect for physical damage. Check the packing list to determine that all items have been received. Immediately report any damages (retain the shipping carton) and shortages to the Ampex distributor and the transportation company. Remove all materials (adhesive tape, rubber bands, etc.) used to secure tape-handling and other moving components during shipment.

POWER REQUIREMENTS

The MM-1100 requires 115 volts at 50 or 60 Hz. Power is connected by a grounding-type (three-prong) plug.

CAUTION

**BE SURE THE POWER PLUG IS PROPERLY GROUNDED
BY MEANS OF THE CENTER PRONG.**

CABLE CONNECTIONS

Audio signals are connected to and from the MM-1100 by the rear panel connectors shown in Figure 5. The connectors are three-conductor XLR-type; females are used for the input connections, while males are used for the output connections. The mating plugs are user-supplied, XLR-type, and should be used with shielded-pair audio cable to provide input and output connections to the MM-1100. Refer to Table 1 for input and output level and impedance specifications.

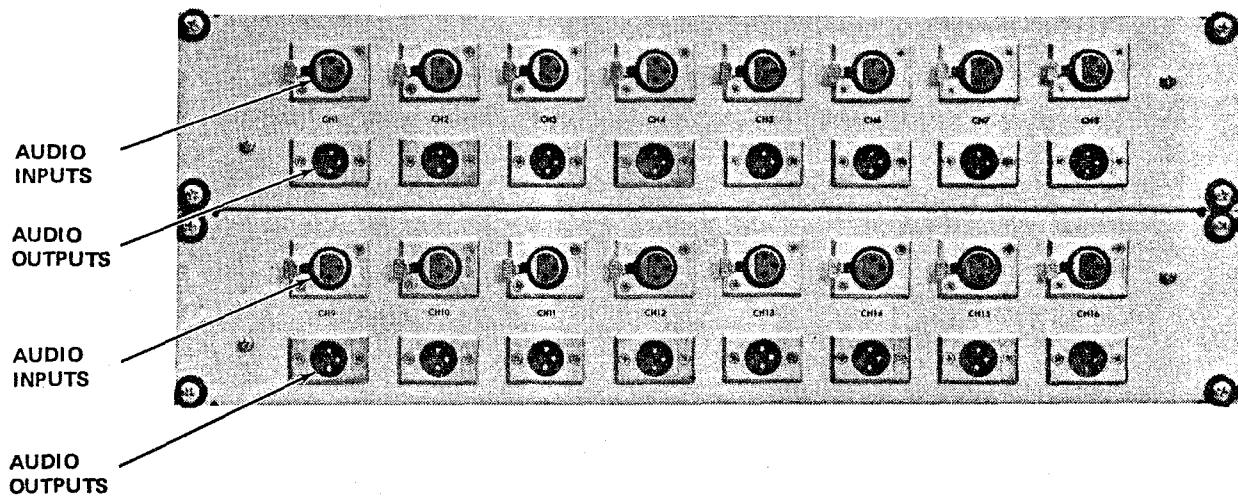


Figure 5. MM-1100 Input and Output Connectors

OPERATION

CONTROLS AND INDICATORS

Operator controls and indicators are provided on the system control box, the individual electronics assemblies, and the meter panel. (Refer to Figure 6.) The control box is shown in Figure 7 and described in Table 2. The electronics controls are shown in Figure 8 and described in Table 3.

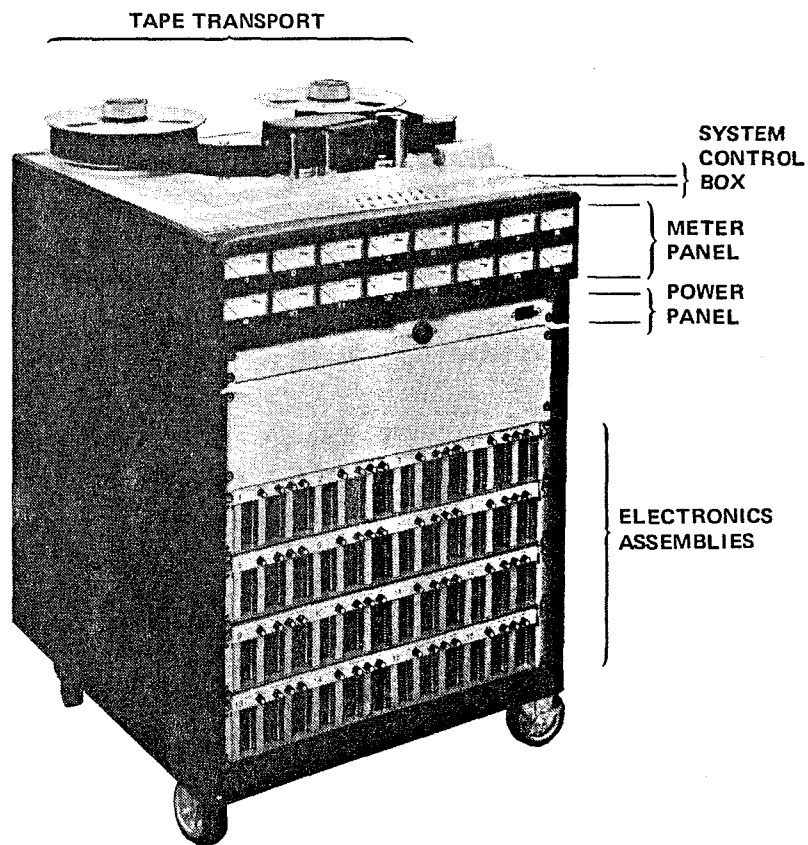


Figure 6. Location of System Components

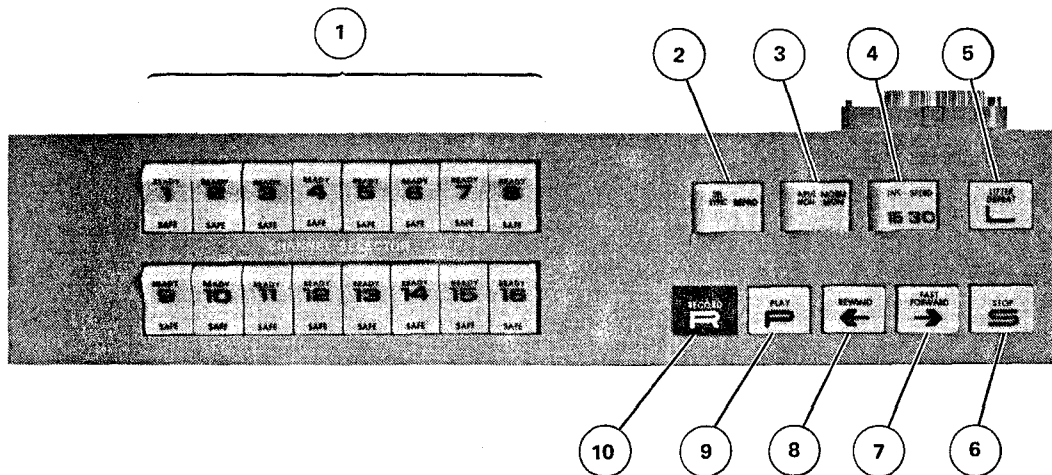


Figure 7. System Control Box, Controls and Indicators

Table 2. System Control Box, Controls and Indicators

FIG. 7 INDEX NO.	NAME	FUNCTION
1	READY/SAFE rocker switches	Permit channel selection for recording. In READY, enable recording on the corresponding channel. In SAFE, no recording is permitted on the corresponding channel.
2	SEL SYNC/REPRO rocker switch	In SEL SYNC, causes all channels to reproduce from the record heads. In REPRO, causes all channels to reproduce from the reproduce heads. (Sel Sync operation is described later in this section.)
3	INPUT MON/NORMAL MON rocker switch	In INPUT MON, causes the audio input to be connected directly to the audio output of those channels with their READY/SAFE switches set to READY. In NORMAL MON, causes all audio outputs to be derived from off-tape only.

Table 2. System Control Box, Controls and Indicators (Continued)

FIG. 7 INDEX NO.	NAME	FUNCTION
4	TAPE SPEED 15/30 rocker switch	Permits selection of tape speed.
5	LIFTER DEFEAT push- button switch	Defeats operation of the tape lifters so that the tape may be monitored during the fast forward and rewind modes, and lifted from the heads in play and stop modes
6	STOP pushbutton switch	Stops the transport from any operating mode. Also used to halt the recording of all channels without stopping the transport if the RECORD pushbutton is held while the STOP pushbutton is momentarily pressed
7	FAST FORWARD pushbutton	Causes the tape to move forward in the fast mode
8	REWIND pushbutton switch	Causes the tape to reverse in the fast mode
9	PLAY pushbutton switch	Places the system in the reproduce mode
10	RECORD pushbutton switch	Pressed simultaneously with the PLAY pushbutton to place the system in the record mode. Only those channels with their READY/SAFE switches set to READY will record; those with the switch in the SAFE position will reproduce using the head selected by the SEL SYNC/NORMAL switch

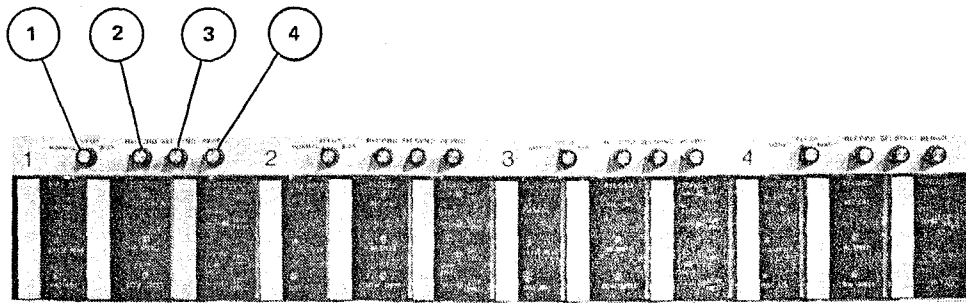


Figure 8. Electronics Module Controls

Table 3. Electronics Module Controls

FIG. 8 INDEX NO.	NAME	FUNCTION
1	NORMAL/SET UP/BIAS switch	In NORMAL, vu meter monitors the reproduce output; in the record mode, vu meter monitors the input. In SET UP, causes the system to reproduce while in the record mode with the reproduced audio output connected to the vu meter. In BIAS, connects the output of the bias amplifier to the vu meter.
2	RECORD control	Adjusts the level of the signal being recorded
3	SEL SYNC control	Adjusts the level of the reproduced signal when the SEL SYNC/REPRO switch is in the SEL SYNC position (Sel Sync mode).
4	REPRO control	Adjusts the level of the reproduce signal when the SEL SYNC/REPRO switch is in the REPRO position (normal reproduce mode)

OPERATING PROCEDURES

MAKING A RECORDING – WITHOUT SEL SYNC

To make a recording without using the Sel-Sync feature, proceed as follows:

1. If necessary, clean and demagnetize the tape path as described in the Maintenance section.
2. To apply power to the system, open the cabinet front doors and place the POWER switch (in the upper right corner) to ON.
3. If not previously done, calibrate the reproduce amplifier levels as described in the Maintenance section.
4. Thread a bulk-erased reel of tape onto the transport as shown in Figure 9, and close the head gate.

NOTE

It is good practice to bulk-erase all tape prior to using it for recording.

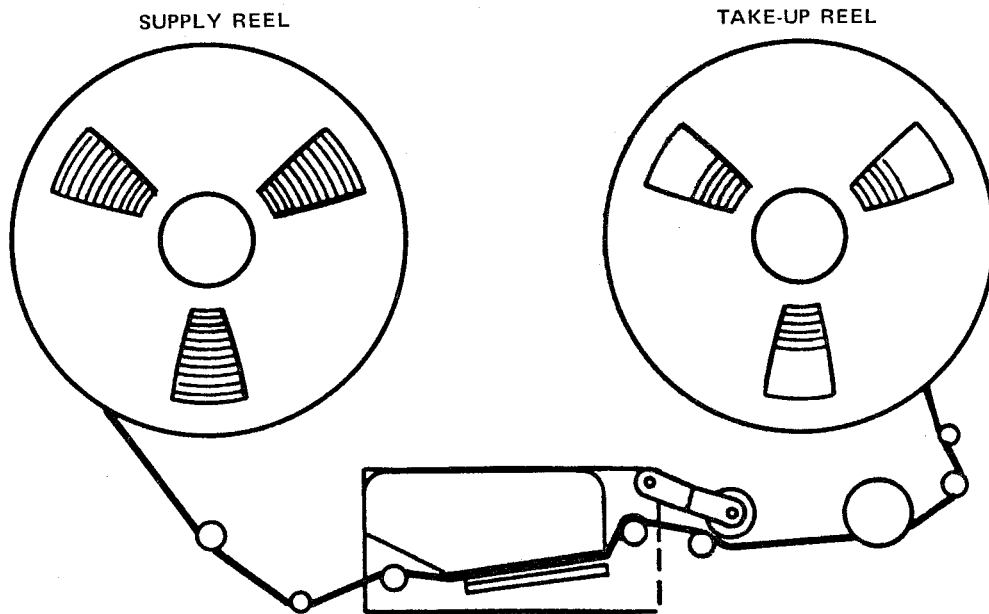


Figure 9. Tape Threading Path

5. On the system control box:
 - a. Set the TAPE SPEED switch to the desired recording speed.
 - b. Set the INPUT MON/NORM MON switch to NORM MON.
 - c. Set the SEL SYNC/REPRO switch to REPRO.
 - d. Set the READY/SAFE switches of those channels to be recorded to the READY position; all others to SAFE.
6. Open the front cabinet doors and set the NORMAL/SET UP/BIAS switch of the channels to be recorded to the SET UP position.
7. With the audio sources connected to the appropriate channel inputs, perform a test or rehearsal run by simultaneously pressing the PLAY and RECORD switches. During this test run, adjust the appropriate individual RECORD level controls (on the electronics assemblies) to obtain audio peaks of 0 vu on the corresponding vu meters.
8. When each of the RECORD level controls has been properly adjusted, press the STOP switch to halt the transport.
9. On the electronics modules, set the NORMAL/SET UP/BIAS switches to NORMAL.
10. Re-cue the tape at the beginning and initiate the record mode by pressing the PLAY and RECORD switches simultaneously.
11. The record mode can be halted by any of the following methods:
 - a. If it is desired to halt recording on all channels without stopping the transport, hold the RECORD switch and momentarily press the STOP switch.
 - b. If it is desired to halt recording on a selected channel(s), place the corresponding READY/SAFE switch(es) in the SAFE position.
 - c. If it is desired to halt the transport, press the STOP switch.

MAKING A RECORDING — WITH SEL SYNC

To make a recording using the Sel-Sync Feature, proceed as follows (Sel-Sync operation is described later in this section).

1. If necessary, clean and demagnetize the tape path as described in the Maintenance section.
2. To apply power to the system, open the cabinet front doors, and place the POWER switch (in the upper right corner) to ON.
3. If not previously done, calibrate the reproduce amplifier levels as described in the Maintenance section.
4. Thread the master tape onto the transport as shown in Figure 9 and close the head gate.
5. On the system control box:
 - a. Set the TAPE SPEED switch to the desired recording speed.
 - b. Set the INPUT MON/NORM MON switch to NORM MON.
 - c. Set the SEL SYNC/REPRO switch to SEL SYNC.
 - d. Set the READY/SAFE switches of the channel(s) to be recorded to the READY position; all others to SAFE.
6. Connect monitoring facilities (headphones or loudspeaker) to the outputs of the channel(s) to be monitored. Refer to Table 1 for output specifications.
7. Open the front cabinet doors and set the NORMAL/SET UP/BIAS switches of the channel(s) to be recorded to the SET UP position.
8. With the audio sources connected to the appropriate channel inputs, perform a test or rehearsal run by simultaneously pressing the PLAY and RECORD switches. During this test run, adjust the appropriate individual RECORD level controls (on the electronics assemblies) to obtain audio peaks of 0vu on the corresponding vu meters.
9. When each of the RECORD level controls has been properly adjusted, press the STOP switch to halt the transport.
10. On the electronics assemblies, set the NORMAL/SET UP/BIAS switches to NORMAL.
11. Re-cue the tape at the beginning of the master tape and initiate the recording mode by simultaneously pressing the PLAY and RECORD switches. In this mode, the audio reproduced is in exact sync with that being recorded.

12. The record mode can be halted by any of the following methods:
 - a. If it is desired to halt recording on all channels without stopping the transport, hold the RECORD switch and momentarily press the STOP switch.
 - b. If it is desired to halt recording on a selected channel(s), place the corresponding READY/SAFE switch(es) in the SAFE position.
 - c. If it is desired to halt the transport, press the STOP switch.

REPRODUCING A PREVIOUSLY RECORDED TAPE

Reproduce tape as follows:

1. If necessary, clean and demagnetize the tape path as described in the Maintenance section.
2. To apply power to the system, open the cabinet front doors and place the POWER switch (in the upper right corner) to the ON position.
3. Thread the tape to be reproduced onto the transport as shown in Figure 9, and close the head gate.
4. On the system control box:
 - a. Set the TAPE SPEED switch to the required tape speed.
 - b. Set the INPUT MON/NORM MON switch to NORM MON.
 - c. Set the SEL SYNC/REPRO switch to REPRO.
 - d. Set all READY/SAFE switches to SAFE.
 - e. Press the PLAY switch.
5. Adjust the appropriate REPRO level controls (on the electronics assemblies) to obtain the desired audio level.
6. Press the STOP switch to terminate the reproduce operation. If the tape supply is exhausted before the operator halts operation, the transport will automatically halt.

FAST WINDING

For tape editing or cueing, the tape is rapidly wound by pressing the REWIND or FAST FORWARD switch. The switches can be pressed alternately without first stopping tape motion. When the desired point on the tape is reached, press the STOP switch to halt the tape. If the tape runs off either reel, the transport will automatically stop. The REWIND and FAST FORWARD switches can be pressed while in the record or reproduce modes without first stopping the tape; however, the PLAY switch must be pressed in order to enter the record mode (i.e., pressing the PLAY and RECORD switches simultaneously).

A tape-lifter mechanism, which automatically lifts the tape off the heads during fast winding, can be prevented from operating by means of the LIFTER DEFEAT switch. Holding the LIFTER DEFEAT switch permits monitoring of the reproduced audio during the fast wind modes for cueing purposes. It is good practice to avoid unnecessary use of this feature to minimize head wear. Alternatively, during play or stop modes holding the LIFTER DEFEAT switch will cause the tape to be lifted away from the heads.

SEL SYNC OPERATION

The main function of the Sel-Sync feature is to enable the recording of material precisely in step with previously recorded material. In conventional multi-track recorder/reproducer systems, the different physical locations of the record and reproduce heads along the tape path cause a timing error between material being reproduced on one channel and material being recorded on another. This set-up is shown in the upper diagram of Figure 10 where the material is recorded a fraction of a second before it is reproduced. The result is that the listener who is reproducing one channel (refer to the center diagram of Figure 10) while recording another in step, ends up with the newly recorded track slightly behind the previously recorded track.

The solution to this problem is the Sel-Sync mode of operation. As shown in the lower diagram of Figure 10, a channel placed in the Sel-Sync mode causes the previously recorded audio to be reproduced by the record head and fed to the audio output, thereby eliminating the timing error caused by a displaced reproduce head. When a pre-recorded channel is monitored in this mode, the listener can record on another channel (or channels) while maintaining synchronism.

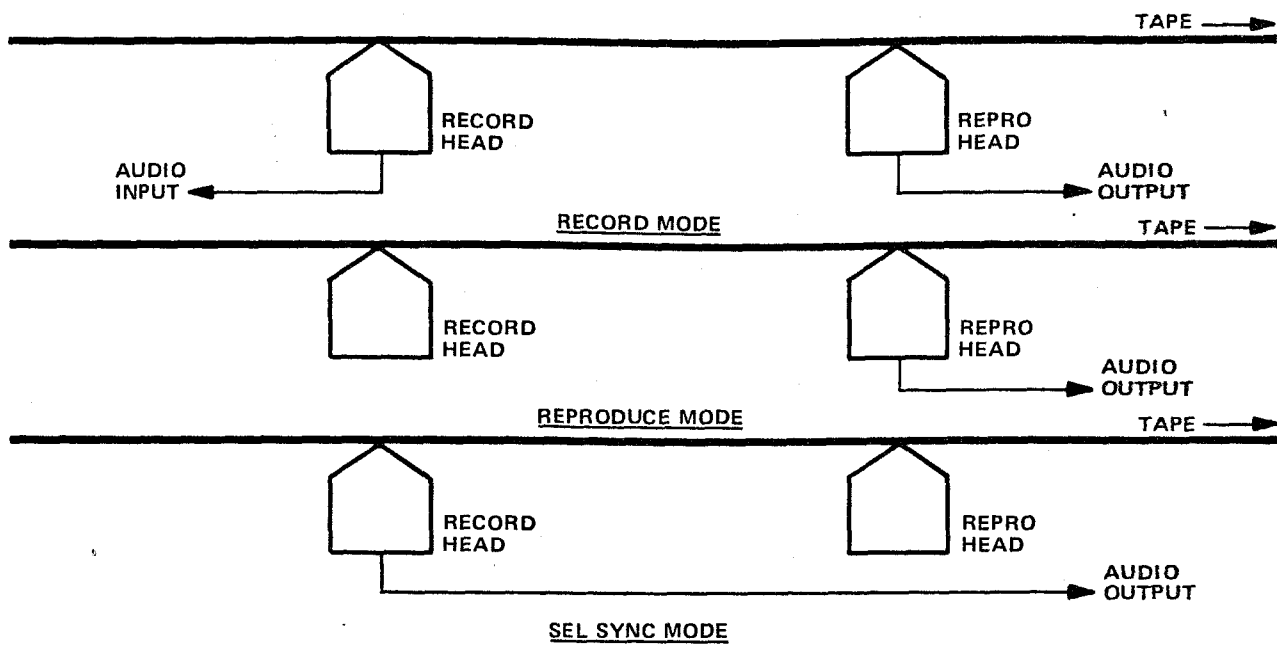


Figure 10. Head Usage for Different Operating Modes

MAINTENANCE

CLEANING

All components in the tape path should be cleaned every eight hours of transport operation, or more often as required by visual inspection, to remove accumulations of oxide deposited by the recording tape. Excess oxide deposits can cause degradation of equipment performance. Proceed as follows to perform periodic cleaning procedures:

CAUTION

USE RECOMMENDED SOLVENTS WHEN CLEANING TAPE PATH COMPONENTS, AND DO NOT USE METAL TOOLS FOR CLEANING. DO NOT ALLOW TAPE HEAD CLEANER TO COME IN CONTACT WITH THE RUBBER IDLER ROLLER OR PLASTIC FINISHES. FAILURE TO OBSERVE THIS CAUTION MAY RESULT IN DAMAGE TO TAPE PATH COMPONENTS.

1. Clean tape heads with a cotton-tipped wooden applicator moistened in Ampex Head Cleaner (4010823 or 087-007). Do not allow tape cleaning fluid to come in contact with capstan idler roller; the cleaning fluid will damage the rubber tire and cause tape slippage.
2. Clean tape guides, the capstan, and the capstan idler with isopropyl alcohol. Take care to remove fingerprints from the rubber idler roller and capstan, and immediately remove any oil deposits from the rubber idler roller.

CAUTION

DO NOT USE COMPRESSED AIR FOR CLEANING TRANSPORT MECHANISMS. THE AIR PRESSURE CAN FORCE DIRT PARTICLES INTO BEARINGS AND CAUSE DAMAGE TO TRANSPORT COMPONENTS.

DEMAGNETIZATION

Tape heads and other components in the path can acquire permanent magnetization which increases signal noise and distortion, and partially erases high frequencies on recorded tapes. Demagnetize tape path components after each eight hours of operation, using Ampex Head Demagnetizer 4010820 or equivalent as follows:

1. Turn equipment power off, and remove any recorded tape near the transport (tape could be partially erased by the demagnetizer).
2. Cover the demagnetizer tips with pressure-sensitive tape (to prevent scratching the heads).
3. With the demagnetizer at least three feet from the recorder, connect it to a 110-120-volt ac power source.
4. Slowly move the demagnetizer toward the head stack.
5. Simultaneously and lightly touch the two demagnetizer tips to both faces of the head stack.
6. Hold the tips perfectly parallel to the stack face at all times. With a slow, even motion, move the tips up and down the stack several times. Slowly withdraw the demagnetizer (slow withdrawal is required for effective demagnetization).
7. Repeat steps 4 through 6 at each head stack and tape guide (including the one on the tape tension arm).
8. Move the demagnetizer at least three feet from the recorder, then de-energize it.

LUBRICATION

The MM-1100 requires no periodic lubrication. All moving parts are permanently lubricated at the factory prior to shipment.

CAPSTAN SERVO

SPEED PAIR SELECTION

The control panel SPEED switch permits selection of high or low-speed operation (normally 30 and 15 in/s) of the transport. These speeds are determined by two shorting plugs on the capstan servo card, as detailed in Table 4.

Table 4. Speed Strap Positions

SPEED STRAPPING			
RANGE	60 in/s	30 in/s	15 in/s
	30 in/s	15 in/s	7-1/2 in/s
HI	E5 to E6	E5 to E3	E5 to E4
LOW	E2 to E3	E2 to E4	E2 to E1
		15	7.5

VARIABLE SPEED TAPE MODE

Using a dummy plug in J4 on the rear of the machine causes the capstan motor to run locked to a crystal-controlled reference of 9600 Hz. To operate the system at variable speeds, it is necessary only to remove the plug and insert a variable frequency oscillator (square or sine wave) into pins 2 (HIGH) and 3 (COMM). A frequency of 9600 Hz will correspond to the speed indicated on the control box (speed switching and equalization switching still function in the variable speed mode). Varying this frequency will vary the capstan speed. Input voltage to J4 should be greater than 3 v_{p-p} but must not exceed 30 v_{p-p}.

SERVO GAIN ADJUSTMENT

Servo gain adjustment R19 on the capstan servo pwa is normally adjusted to mid-range; however, to minimize flutter, it may be adjusted by observing the servo error signal at TP2 on the card and advancing R19 clockwise for minimum jitter. A 9600-Hz square wave at TP1 indicates that the crystal reference oscillator is functioning properly.

TRANSPORT CONTROL

SETUP PROCEDURE

Preliminary Procedure

1. Place transport control card (4050706-01) into the extender card provided, ensuring that the component side of the card is facing outward toward the meter panel, and re-insert card into the transport control chassis.
2. Position potentiometers R1 through R8 fully ccw, and R9 at mid-range. Secure the end-of-tape arm out of the tape path using masking tape.

Normalizing Reel Servos

1. Energize the equipment in stop mode, hold the tension sensor arm all the way in toward the center of the transport, and adjust supply gain potentiometer R7 until torque on the supply reel just reduces to zero (Figure 11).
2. Again, while holding the tension sensor arm all the way in, place the machine in rewind mode and adjust takeup gain potentiometer R8 until torque on the takeup reel just reduces to zero.
3. De-energize the machine and thread a tape of the largest reel size expected to be used on the machine (up to 16 inches).

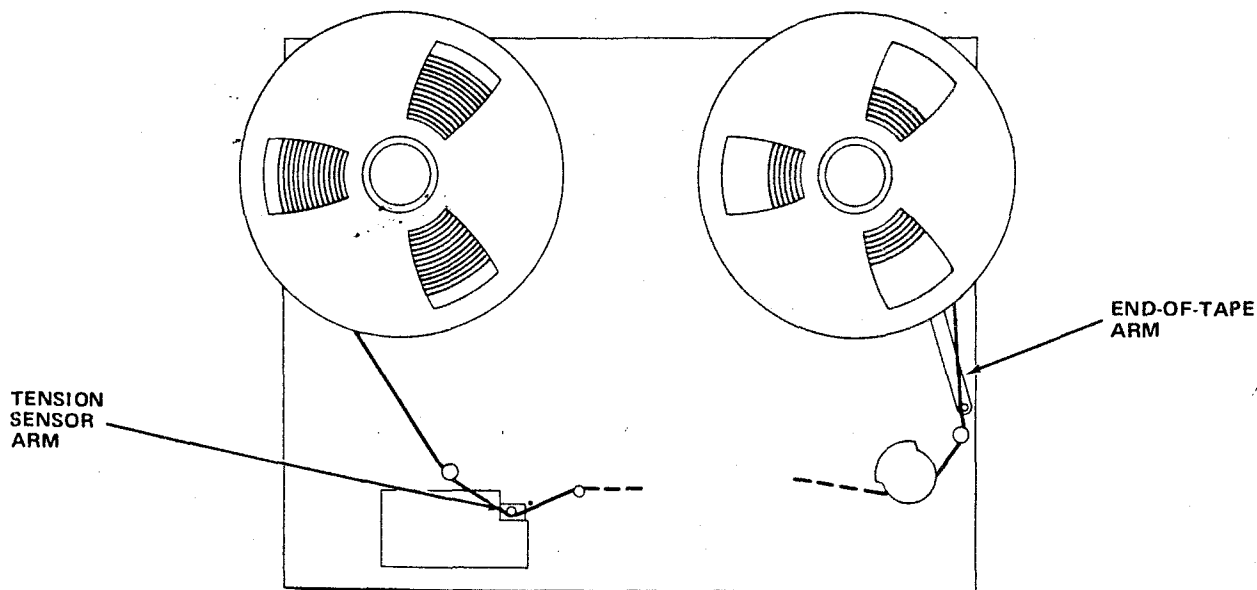


Figure 11. Normalizing Reel Servos

TENSION ADJUSTMENTS

Stop Tension

1. While holding the takeup reel securely, energize the machine and adjust supply stop tension potentiometer R3 until the edge of the tension sensor arm just lines up with the center-punch mark on the transport deck (Figure 12), indicating 10 ounces of supply tension.

NOTE

If the transport exhibits a tendency to oscillate during these adjustments, overall gain adjustment R9 should be rotated ccw until the oscillations just stop. This adjustment should be made with a minimum tape pack on the supply reel, using the smallest available reel.

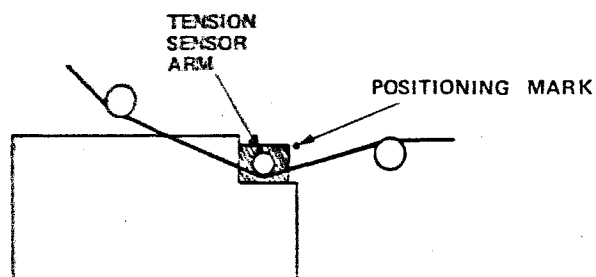


Figure 12. Positioning Tension Sensor Arm

2. With approximately equal packs on the supply and takeup reels, adjust stop takeup potentiometer R6 until tension on the takeup reel just equals that on the supply reel. This is indicated when there is no tendency for the machine to "creep" in stop mode.

NOTE

The above adjustments result in relatively high tension in stop mode. For ease of tape handling and editing purposes, R3 and R5 may be adjusted so that tension is approximately one-half of normal or less. Check that balance is maintained to prevent creeping.

Play Tension

1. Remove the masking tape from the end-of-tape arm and push the arm toward the center of the transport against the stop. This will release reel tensions and apply the brakes. Now loop the tape around the outside of the capstan, and take up the slack in the tape until the brakes release.
2. Push the PLAY button while holding the takeup reel securely, and adjust play supply potentiometer R2 until the tension sensor arm lines up with the center punch mark (Figure 12). Now release the takeup reel and adjust play takeup potentiometer R5 until tensions are approximately equal on both reels.
3. At 30 in/s, record a 3-kHz test signal at normal operating level at the beginning of a reel. A recording time of 90 seconds is sufficient. Rewind the tape.
4. Monitor the 3-kHz output of the channel just recorded. Press the PLAY and STOP pushbuttons alternately. When you press PLAY, the reproduced signal will normally rise to the correct tone. If, however, play tension is too high, the tape may overspeed for a moment before settling to the correct tone.
5. If the tape does overspeed, adjust R5 to the point just below where overspeed occurs.

Shuttle Tension

1. With all the pack on the supply reel, push the REWIND button and adjust rewind takeup potentiometer R4 so that the tape just begins to rewind.
2. With all the pack on the takeup side, push the FAST FORWARD button and adjust fast forward supply potentiometer R1 so that the tape just begins to move forward.

These settings will result in optimum tape pack on a reel and maximum accuracy of the tape timer; however, for more rapid fast forward and rewind shuttling, R4 and R5 may be adjusted for less holdback tension.

15/27-VOLT AND 39-VOLT POWER SUPPLIES

The MM-1100 power supplies feature both over-voltage and over-current protection. In addition, the 39-volt supply (4050658-01) contains the 150-kHz bias and erase oscillator. The 15/27-volt supply is normally mounted on the bottom of the frame. As indicators of supply operation, the meter panel lamps are powered by the 39-volt supply; the control box is powered by the 27-volt supply.

VOLTAGE ADJUSTMENTS

Voltage adjustments are made by means of access holes in the rear of the machine. Pin jacks are provided to accommodate meter probes, in accordance with Table 5.

Table 5. Voltage Test Points

VOLTAGE	TEST POINT	CONTROL	SUPPLY
15 ±0.5 volts	TP2	R2	4050699-02
27 ±0.5 volts	TP1	R1	4050699-02
39 ±0.5 volts	TP1	R1	4050658-01

Measurements in Table 5 are from the appropriate test point to TPG (ground). The erase/bias oscillator is tuned through an access hole in the side of the frame, which is reached by removing the right side panel.

Line voltage fuse F1 (5 A, slow-blow) and over-voltage protection fuse F2 (10 A, fast-blow) are on the back of the machine. The over-current protection circuit can be reset by turning the machine off for approximately 20 seconds, then re-energizing it.

CONTROL BOX

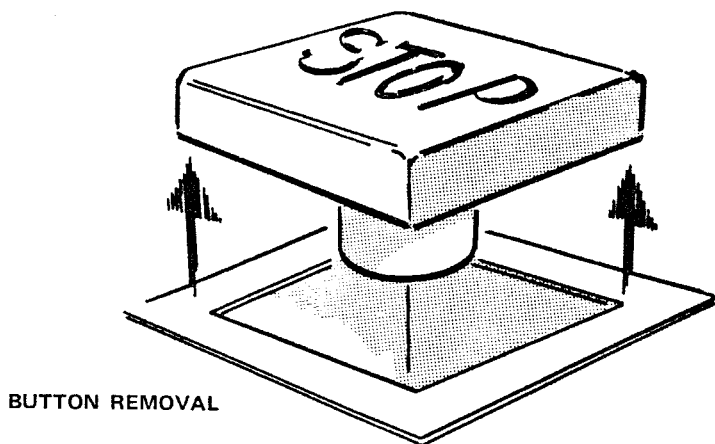
The control box can be removed from the transport for servicing by pulling the meter panel fully forward and forcing the control box up to disengage the "snap" fasteners on its base.

There is no active circuitry in the control box, and servicing will consist primarily of changing lamps.

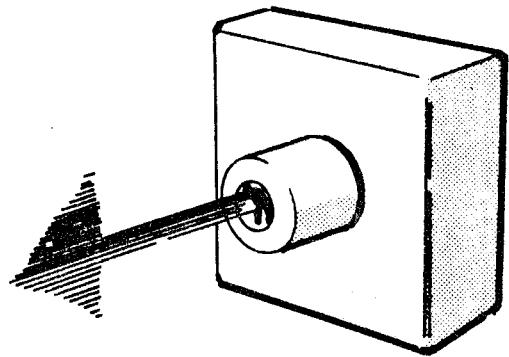
BULB REMOVAL

Pushbutton bulbs (no. 327) are removed by pulling the button directly up and out, as shown in Figure 13, and removing the bulbs from the barrel of the button.

The rocker switch bulbs (Ampex part no. 060-471) are removed by putting the particular switch in READY and the adjacent switches in SAFE, then removing the switch with pliers, thus exposing the bulb, as shown in Figure 14.



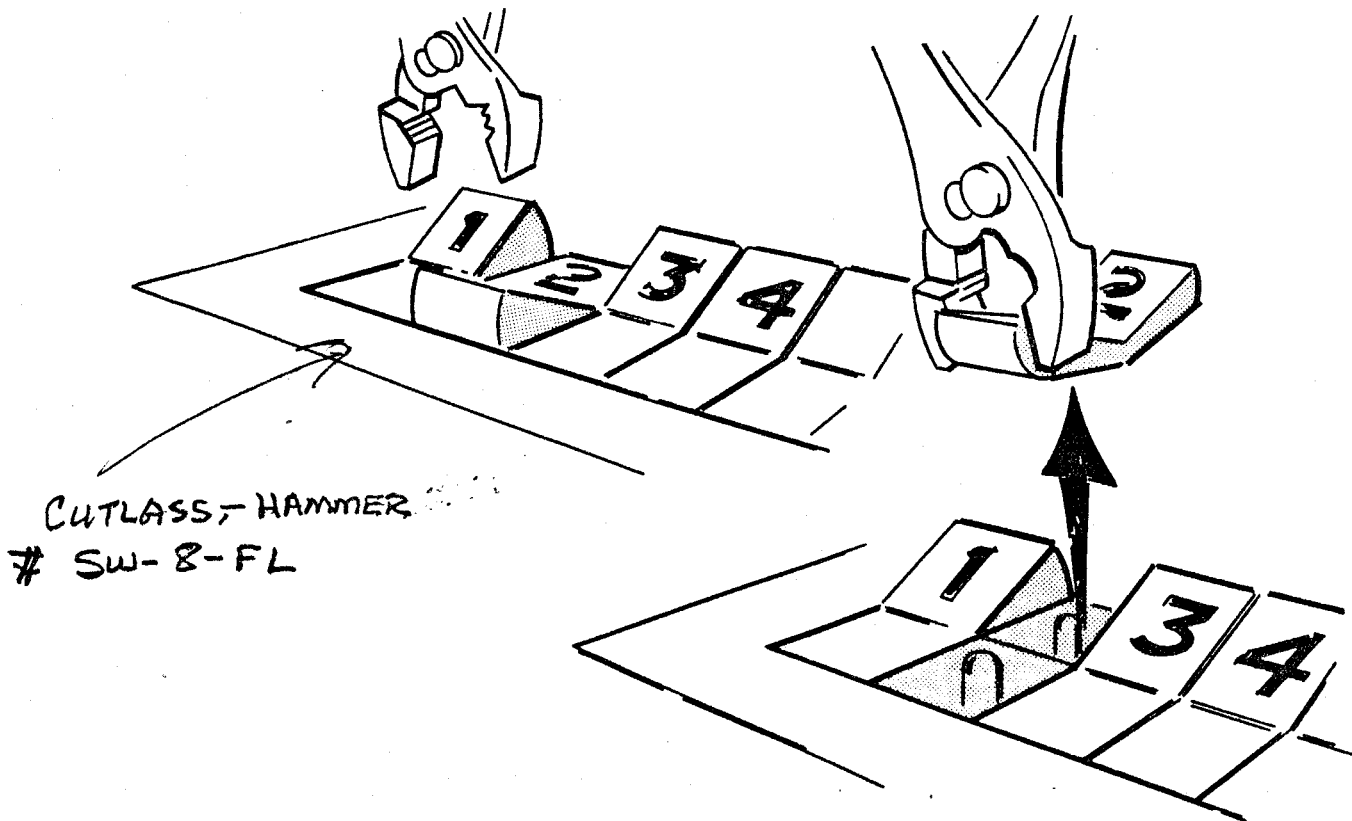
BUTTON REMOVAL



LAMP REMOVAL

Figure 13. Button and Lamp Removal

(#327)
STD



CUTLASS, HAMMER
SW-8-FL

Figure 14. Rocker Switch Bulb Removal

REMOTE CONTROL AND TRANSPORT-ONLY CONTROL

A remote control cable is required for remote operation. For remote control, the control box assembly is removed, as described earlier in this section, and connected to the remote control connector on the rear of the frame via the remote control cable. In addition, a "transport only" control box is available as an option to fit in the original control box position, if desired.

MDA ASSEMBLY

The MDA assembly consists of three separate motor-drive amplifiers, one for each reel motor, and one for the capstan. The reel MDA's are unique in that they use optical couplers to isolate the low-level (27-volt) signal from the transport control to the high-level (117-vac) drivers to the reel motors. No adjustments are necessary on the MDA. However, under failure conditions where full torque is applied to a reel regardless of transport mode, the isolators (A1, A2) should immediately be checked.

METER PANEL ASSEMBLY

CHICAGO MINN. #334

Meter panel servicing should be limited to bulb replacement. Bulbs are wired in series/parallel, and may be replaced by pulling the panel out to its extreme forward position (ensuring that doors are closed). Be careful to prevent lamp sockets from shorting to the panel itself.

HEAD ASSEMBLY

The head assembly can be quickly changed to convert from two-inch to one-inch format. To remove the head assembly, lift off the moulded head cover and back out the large jackscrew. Reverse this procedure when replacing the head assembly. When changing formats, ensure that the two quick-change guides on the transport are also switched. A shorting bar is included on all two-inch erase head assemblies to properly program tensions on the transport; thus, tension changes are automatically effected when the format is changed.

TAPE LIFTER ADJUSTMENT

Tape lifter positions can be adjusted by removing the tension sensor cover, exposing two hex socket cap screws. These screws may be loosened and repositioned to adjust lifter positions.

TEST EQUIPMENT

Test equipment required for checkout and adjustment is listed in Table 6.

Table 6. Test Equipment Required for Checkout and Adjustment

DESCRIPTION	IDENTIFICATION	USED FOR
Spring gauge, 0-30 ounces	Model LO-2M, Hunter Spring Co., Lansdale, Penn. (Ampex 650-105)	Tape Tension checkout
Spring gauge, 0-10 pounds	Gauge-R, Chatillon, N.Y. (Ampex 650-104)	Idler roller pressure and brake force checkout
Nylon line or cord, 30 inches long	N/A	Idler roller pressure checkout
Vacuum Tube Voltmeter	Model 400D, Hewlett Packard Co., Palo Alto, California	Tape tension potentiometer adjustment and general purpose electronic measurements
Flutter Bridge	Model 8155-01 or 8100-W, Mincom, a Division of 3M, Camarillo, California; or Model ME102B, Gotham Audio, New York, New York	Flutter check
Wave Analyzer	Model 302A, Hewlett Packard Co.	Harmonic distortion checkout

Table 6. Test Equipment Required for Checkout and Adjustment (Continued)

DESCRIPTION	IDENTIFICATION	USED ON
Frequency Counter	Model 5216A, Hewlett Packard Co.	Reference oscillator checkout
Signal Generator	Model 204C or 209D, Hewlett Packard Co.	Record/reproduce electronics alignment
Test Tape	Ampex (refer to Table 8 for applicable part number)	Record and reproduce alignment

BRAKE ADJUSTMENT

(See Figure 15.) The brake system stops reel rotation and maintains tape tension when the equipment power is removed while in any operating mode. A brake differential is necessary to

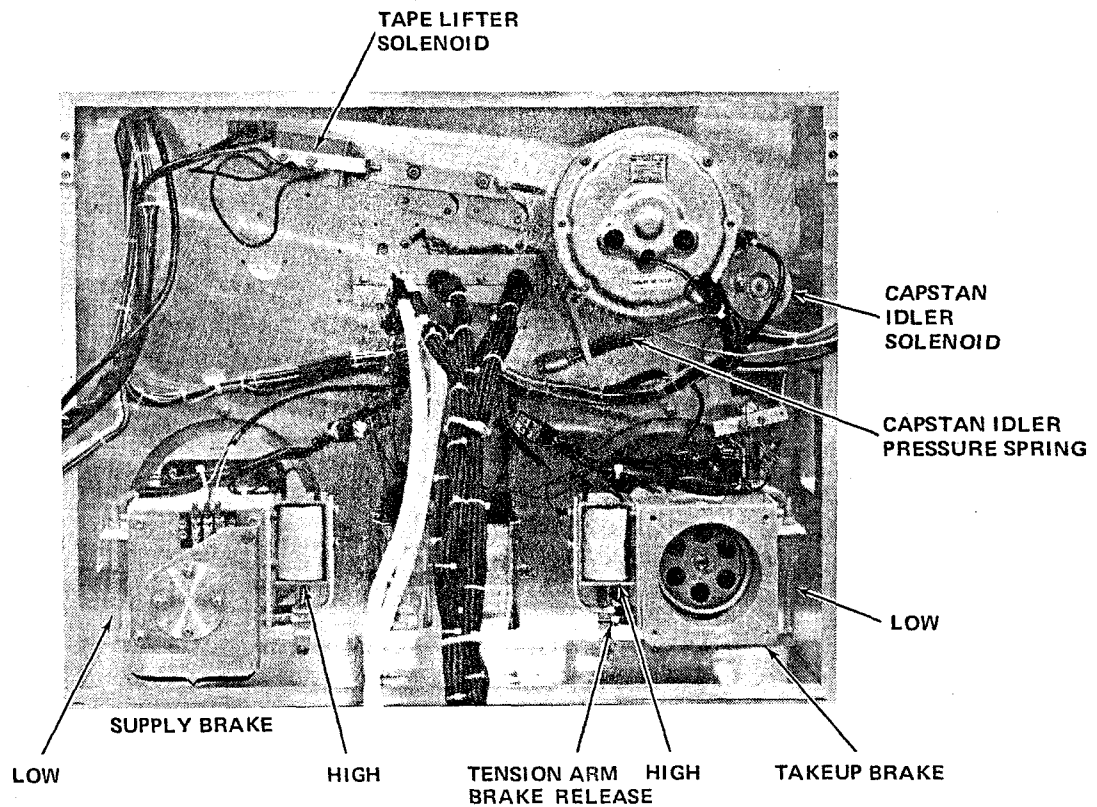


Figure 15. Transport Adjust Points

maintain tension while stopping; the brake force is therefore higher for the tape-feeding reel in every case. Braking functions are checked with power off and no tape installed.

TAKEUP REEL BRAKES

Adjust the takeup reel brakes as follows:

1. Wrap all of 4-foot nylon cord ccw on takeup reel and insert hook of the 0 to 30-ounce scale in a cord loop.
2. Hold scale parallel to floor and as close as possible to reel, then pull scale (takeup turntable rotates ccw).
3. Tap reel to ensure a correct reading, then pull cord steadily and read scale indication. Repeat this procedure until scale reading has been the same several times. The scale should indicate the value given in Table 7.
4. If the reading is not within limits, slightly turn takeup reel brake adjustment nut (cw increases braking), then repeat procedures beginning with step 2.
5. Wrap all of the cord cw on reel, and insert hook of the 1 to 10-lb scale in cord loop.
6. Hold scale parallel to floor and as close as possible to reel, then pull the scale (takeup turntable rotates cw).
7. Tap reel, to ensure a correct reading, then pull cord steadily and read scale indication. Repeat this procedure until scale reading has been the same several times. The scale should indicate the value given in Table 7.
8. If the reading is not within limits, slightly adjust nuts on each side of brake solenoid an equal number of turns (cw increases braking), then repeat procedures beginning with step 6.

NOTE

If the tension varies while the cord is being pulled at a steady rate, the tensions of the springs may be unequal.

Table 7. Transport Brake Torques

SUPPLY REEL		TAKEUP REEL	
REWIND (CW)	FORWARD (CCW)	REWIND (CW)	FORWARD (CCW)
14 – 18 oz.	4-1/2 ($\pm 1/4$) lb	4-1/2 ($\pm 1/4$) lb	14 – 18 oz.

SUPPLY REEL BRAKES

(See Figure 15.) Adjust the supply reel brakes as follows:

1. Wrap all of nylon cord cw on reel and insert hook of the 0 to 30 ounce scale in cord loop.
2. Hold scale parallel to floor and as close as possible to reel, then pull scale (supply turntable rotates cw).
3. Tap reel to ensure a correct reading, then pull cord steadily and read scale indication. Repeat this procedure until scale reading has been the same several times. The scale should indicate the value given in Table 7.
4. If the reading is not within limits, slightly turn takeup reel brake adjustment nut (cw increases reading), then repeat procedures beginning with step 2.
5. Wrap all of the cord ccw on reel, and insert hook of the 1 to 10-lb scale in cord loop.
6. Hold scale parallel to floor and as close as possible to reel, then pull the scale (supply turntable rotates ccw).
7. Tap reel to ensure a correct reading, then pull cord steadily and read scale indication. Repeat this procedure until scale reading has been the same several times. The scale should indicate the value given in Table 7.
8. If the reading is not within limits, slightly adjust nuts on each side of brake solenoid an equal number of turns (cw increases braking), then repeat procedures beginning with step 6).

NOTE

If the tension varies while the cord is being pulled at a steady rate, the tensions of the springs may be unequal.

10. Remove scale and cord from transport.

CAPSTAN IDLER

The capstan idler force against the moving capstan is determined by the capstan idler pressure spring. The force is adjusted by a locknut which compresses the capstan idler spring shown in Figure 15.

As the solenoid temperature rises, its resistance also rises. When power line regulation is poor, allow 30 minutes or more for warmup (operating in the reproduce mode) before adjusting the capstan idler force. At the factory, the solenoid is checked to be sure it will bottom at line voltages of 90 volts (cold) and 105 volts (hot).

1. Wrap a 12-inch knotted piece of lacing, nylon cord, or twine around pinch roller yoke as shown in Figure 16. Insert hook of 0 to 10-lb scale in cord loop.
2. Tape or block end-of-tape arm in on position.
3. Press PLAY button and pull on scale to pull pinch roller off capstan.
4. The force required to just eliminate pinch roller/capstan contact (pinch roller will stop rotating) is 8-3/4 to 9-1/4 pounds.
5. Press STOP button.

DASH POT ADJUSTMENT

The dash pot adjustments, Figure 17 are set at the factory and do not require readjustment unless tension arm parts or dash pot are replaced, or a malfunction develops. Proceed as follows to check out and adjust dash pot.

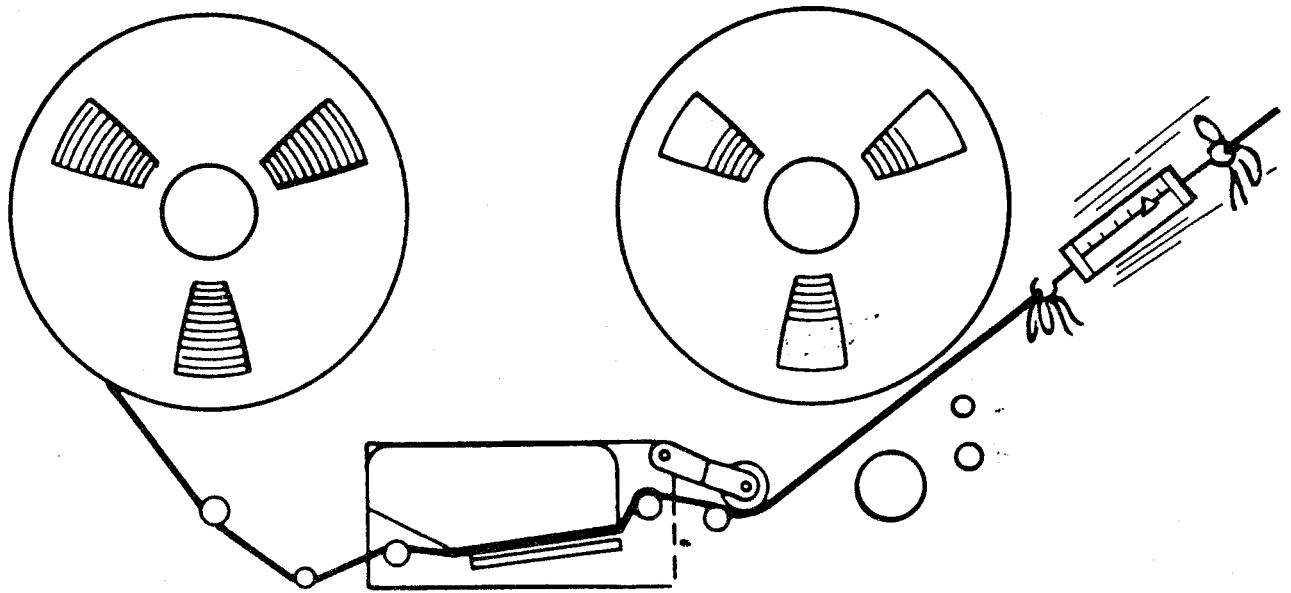


Figure 16. Pinch Roller Adjustment

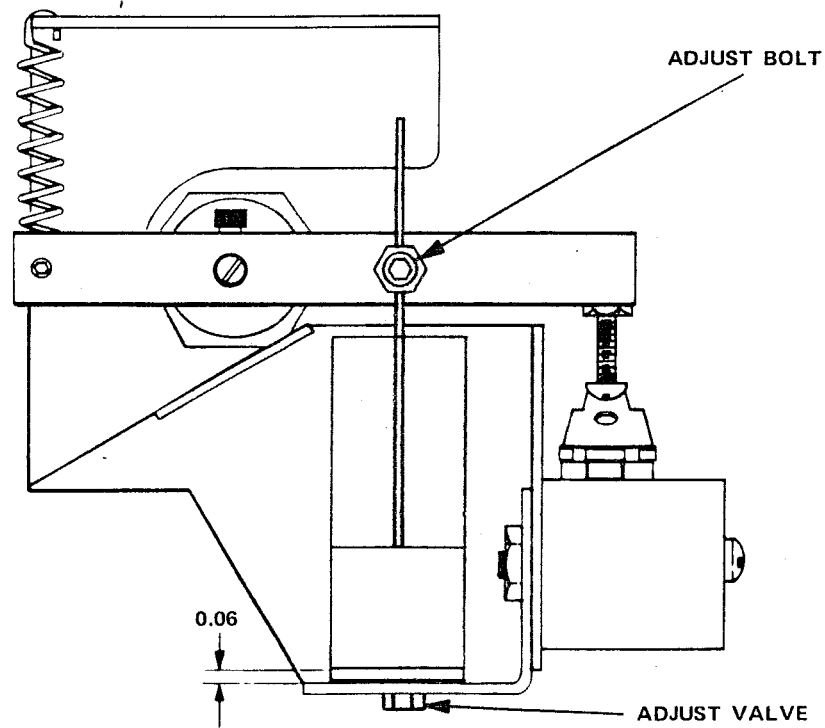


Figure 17. Tension Arm Dash Pot Adjustment

1. With tension arm in released position (safety switch actuated), measure clearance between bottom of plunger and bottom of cylinder. Clearance should be 0.06 inch.
2. If clearance is not as specified, loosen adjust bolt and move plunger up or down as required.
3. Tighten adjust bolt.
4. If end-of-tape switch is not actuated as soon as desired when end-of-tape condition is reached, rotate adjust valve ccw. Switch should actuate in 1/2 to 1-1/2 seconds after end-of-tape.

AUDIO ALIGNMENT PROCEDURES

These procedures are based on the use of low-noise, high-output tapes (Ampex 406 or equivalent) and reflect the higher saturation levels of these tapes. A new operating level, referred to as "Ampex Mastering Level", is used. This level corresponds to a recorded flux 3 dB higher than the original Ampex operating level. (Ampex Operating Level is 185 nWb/m; hence, Ampex Mastering Level is 260 nWb/m at 500 Hz.)

REPRODUCE ALIGNMENT

1. Degauss and clean heads and other components in the tape path. Use Ampex head cleaner on all components except the pinch roller, which should be cleaned with isopropyl or denatured alcohol.
2. Thread the appropriate alignment tape on the machine (see Table 8).
3. Place all RECORD/SAFE switches to SAFE, INPUT MON/NORMAL MON switch to NORMAL MON, SEL SYNC/REPRO switch to REPRO, and NORMAL/SET UP/BIAS switches on electronics panel to SET UP.
4. Place machine in PLAY mode and on the 700-Hz Ampex operating level section, adjust all REPRO LEVEL controls so that the vu meters read -3 vu (this corresponds to a line output level of +1 dBm).
5. Place the SEL SYNC/REPRO switch in SEL SYNC and repeat step 4, adjusting the SYNC LEVEL controls.

Table 8. Ampex Test Tapes

TYPE		AMPEX PART NUMBER
NAB, 1-inch	15 in/s, 8-track	4690006-01
	15 in/s, full-track	4690005-01
IEC (CCIR), 1-inch	15 in/s, 8-track	4690020-01
	15 in/s, full-track	4690031-01
NAB, 2-inch	15 in/s, 16-track	4690018-01
	15 in/s, full-track	4690024-01
IEC (CCIR), 2-inch	15 in/s, 16-track	4690033-01
	15 in/s, full-track	4690035-01
17.5 μ s, 1-inch	30 in/s, 8-track	4690042-01
	30 in/s, full-track	4690048-01
17.5 μ s, 2-inch	30 in/s, 16-track	4690039-01
	30 in/s, full-track	4690047-01

6. Place the SEL SYNC/REPRO switch back to REPRO. Adjust the reproduce high frequency equalization for the speed in use on the 10-kHz section of the tape for -3 vu on the vu meter.
7. Adjust the reproduce low frequency equalization to give -4 vu at 50 Hz and 30 in/s, and -3 vu at 30 Hz and 15 in/s. (This adjustment is approximate only and must be confirmed by overall record/reproduce.)
8. Check the response at all frequencies on the alignment tape. Specifications are:
 - 30 in/s: ± 2 dB at 50 Hz to 100 Hz, ± 1 db at 100 Hz to 18 kHz
 - 15 in/s: ± 2 dB at 30 Hz to 100 Hz, ± 1 db at 100 Hz to 15 kHz

NOTE

Low-frequency equalizers cannot be adjusted correctly on reproduce only unless an alignment tape recorded to the track format of the machine being aligned is used.

9. Repeat step 8 with SEL SYNC/REPRO switch in SEL SYNC position.
10. Connect a band-limiting filter (Figure 18) between line output and a vtvm to measure reproduce standby noise. The vtvm reading should be less than -58 dBm at either speed for 8 or 16-channel systems, or less than -54 dBm for 24-channel systems.

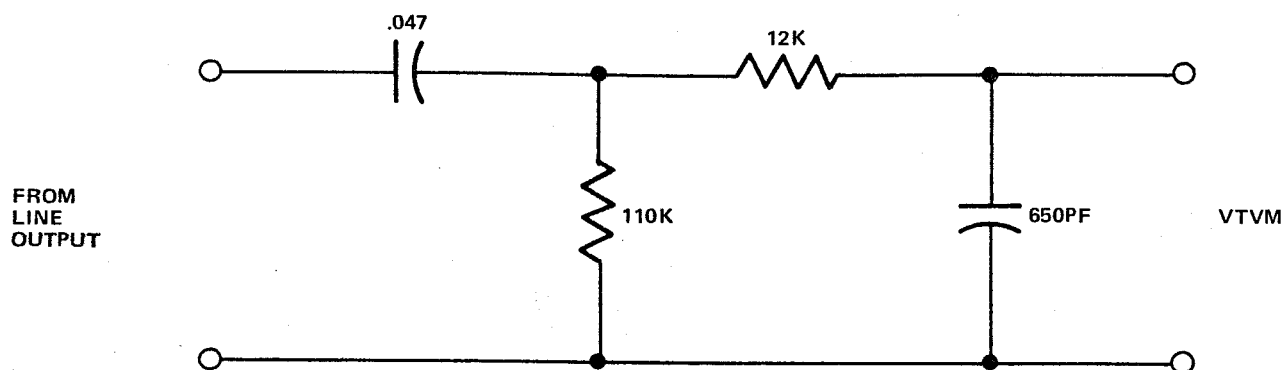


Figure 18. 30 Hz - 18 kHz Band-Limiting Filter

RECORD ALIGNMENT

Do not start record alignment unless the reproduce alignment either has just been done or is known to be correct.

1. Prepare the machine for alignment as follows:
 - a. Thread a reel of blank tape of the type to be used (Ampex 406 or equivalent) onto the transport.
 - b. Connect an oscillator to the line inputs and set it to 1 kHz with a level of +4 dBm.
 - c. Set the READY/SAFE switches of the appropriate channels to be aligned to READY.
 - d. Place the INPUT MON/NORMAL MON switch in the NORMAL MON position.
 - e. Place the NORMAL/SETUP/BIAS switches on the electronics panels to BIAS.

2. Place the machine in the record mode. Observe that all channels in ready mode go into record mode, and that on-scale readings appear on the vu meters. Then do one of the following steps according to the proper system configuration:
 - a. For 8 or 16 channel systems, adjust the ERASE PEAK preset on each bias electronics card to give a maximum reading on the respective vu channel meter. If necessary, adjust the BIAS CAL controls to obtain on-scale readings.
 - b. For 24 channel systems, turn the ERASE PEAK preset fully counterclockwise and then turn this preset slowly clockwise. The bias level indication on the vu meter will change very slowly at first. Then the vu meter will indicate a sudden 2 to 3 dB drop. Continue turning the preset clockwise until the vu meter reading is reduced another 0.5 to 1 dB below the initial drop.
3. Reset all NORMAL/SET UP/BIAS switches to the SET UP position. Adjust RECORD LEVEL controls to give a mid-scale indication on the vu meters.
4. Carefully adjust the BIAS LEVEL control on each record amplifier card to give maximum output as indicated on the vu meters. Then reset the RECORD LEVEL controls until the vu meters indicate 0 vu.
5. Change the oscillator frequency to 15 kHz at +4 dBm output and adjust the appropriate record equalizer to give 0 vu indication on the vu meter (HI SPEED for 30 in/s, LOW SPEED for 15 in/s).
6. Change the oscillator frequency to 50 Hz at +4 dBm output and adjust the reproduce low frequency equalization for the speed in use to achieve a minimum deviation from 0 vu meter indication for frequencies between 30 Hz and 100 Hz at 15 in/s and between 50 Hz and 100 Hz at 30 in/s.
7. Sweep the oscillator through the band 30 Hz to 15 kHz at 15 in/s and 50 Hz to 18 kHz at 30 in/s. With a constant oscillator output level, the vu meter should remain within ± 2 dB (-2 vu to +2 vu) of 0 vu.
8. Set the oscillator to 1 kHz at +4 dBm level and then place the INPUT MON/NORMAL MON switch to INPUT MON. Adjust the REC CAL control on each record electronics card to give 0 vu indication on the vu meter.
9. Place the NORMAL/SET UP/BIAS switch on the electronics panel to the BIAS position and adjust the BIAS CAL control on the bias amplifier card to give 0 vu indication on the vu meter. Return the NORMAL/SET UP/BIAS switch to the SET UP position.

10. Perform the bias trap adjustment as follows:

- a. Place the SEL SYNC/REPRO switch in SEL SYNC. Place the INPUT MON/NORMAL MON switch in NORMAL MON.
- b. Place READY/SAFE switches of channels adjacent to channel to be set in READY position; set switch of channel to be set in SAFE position.
- c. Remove tape from machine and hold the end-of-tape arm in on position with an elastic band or pressure-sensitive tape.
- d. With system power off, mount the record electronics card of the channel to be set on an extender card.
- e. Connect a vtm to the channel line output, switch system power on, and place machine in record mode.
- f. Adjust the bias trap inductor for minimum reading on the vtm. (The bias trap inductor is accessible with a long, insulated core turning tool; it is on the switching card at the rear of the card cage in line with the extended record card.)

OVERALL NOISE AND DISTORTION MEASUREMENTS

A wave analyzer is recommended for making distortion measurements, and is necessary for making erasure depth measurements. An oscillator with less than 0.1% distortion is also required for making distortion measurements. Correct record and reproduce alignment is assumed.

Distortion Measurement

1. Set up the system for distortion measurement as follows:
 - a. Thread a reel of degaussed tape of the type to be used (Ampex 406 or equivalent) onto the transport.
 - b. Place all READY/SAFE switches to READY.
 - c. Select NORMAL MON and REPRO settings.
 - d. Connect an oscillator to the line inputs. Adjust oscillator frequency to 1 kHz and level to +4 dBm.

2. Place the machine in the record mode. Ensure that all vu meters read 0vu. Adjust RECORD LEVEL controls as required to achieve the indication.
3. Connect the wave analyzer to the line outputs and normalize its full-scale reading at 1 kHz. Measure the second harmonic component; this should not exceed 0.3% or -50 dB with respect to the fundamental. Similarly, measure the third harmonic component; this should not exceed 1% or -40 dB with respect to the fundamental. Repeat this procedure for each channel.
4. If the second harmonic component is high, degauss heads and tape guides thoroughly, and repeat the measurement. A continuing high reading may indicate either a faulty record amplifier output capacitor or a misadjusted bias amplifier. Check the ERASE PEAK adjustment (previously described) initially. The record card may be checked by substitution with another channel. If the record card is not at fault, refer to the Bias Amplifier Alignment.
5. If the third harmonic component is high, the two most likely reasons are that the record level is set too high (reproduce calibration incorrect), or the bias level is incorrectly set. These levels can be reset as previously described.

Noise and Erasure Depth

1. Prepare the machine as follows:
 - a. Thread a reel of tape of the type to be used (Ampex 406 or equivalent) on the transport.
 - b. Connect an oscillator to the line inputs. Set oscillator to 1 kHz and +4 dBm output level.
 - c. Place all NORMAL/SET UP/BIAS switches to SET UP. Place SEL SYNC/REPRO switch in REPRO. Place INPUT MON/NORMAL MON in NORMAL MON.
 - d. Set all READY/SAFE switches to READY.
2. Place machine in record mode and adjust record level controls to give 0 vu indication on vu meters (reproduce calibration should be aligned correctly). Increase oscillator level to +10 dBm. Record at this level for two or three minutes.
3. Rewind the tape to the beginning of the recorded section and remove the oscillator input signal. The inputs should be terminated with a low impedance (600 ohms) or shorted. Connect a vtvm to the line output via a bandpass filter (see Figure 18).

- Place the machine in the record mode once again and read the residual noise of the vtvM for each channel. For 8 and 16-track systems, the meter should read less than -53 dBm, and for 24-track systems, less than -48 dBm. If the ASA "A" weighted filter (Figure 19) is used, after correction for the insertion loss of the filter, the meter should read -55 dBm or greater for 8 and 16-track systems or -51 dBm or greater for 24-track systems.

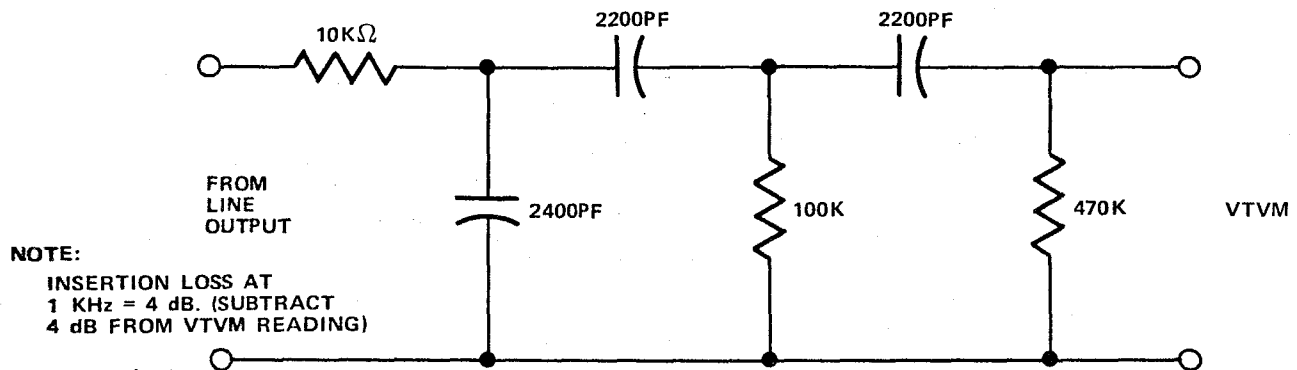


Figure 19. ASA "A" Weighted Filter

NOTE

The figures in step 4 are absolute noise levels. When referred to the peak signal level of +10 dBm, the signal-to-noise ratio is obtained; i.e., meter reads -55 dBm noise using bandpass filter, therefore signal-to-noise ratio is 65 dB unweighted.

- If a wave analyzer is connected to the line output, the erasure depth may also be determined. Measure the residual level of the 1000-Hz signal; the level should not exceed -65 dBm.

BIAS AMPLIFIER ALIGNMENT FOR 8 OR 16 CHANNEL SYSTEMS

NOTE

This adjustment should normally be required only if a bias amplifier card is used in a channel in which it was not previously used or if failure of the card requires component replacement. Operational indications that adjustment may be required are excessive second harmonic noise or noise when all other possible sources of the noise or distortion (e.g., magnetized heads or guides or faulty record amplifiers) have been eliminated.

1. Prepare the machine as follows:
 - a. Place the bias amplifier card of the channel to be aligned on an extender board (Ampex part no. 4020153-01).
 - b. Place the NORMAL/SET UP/BIAS switch in BIAS.
 - c. Place the channel READY/SAFE switch in READY.
 - d. Remove tape from the transport and temporarily secure the end-of-tape switch in the on position.
2. Place the transport in record mode and proceed as follows:
 - a. Adjust the BIAS CAL preset on the bias amplifier card to obtain a 2/3-scale reading on the vu meters.
 - b. Adjust the core of T3 (nearest connector) to achieve maximum reading on vu meter.
 - c. Repeat this procedure for the core of T4 (furthest from connector).
3. Adjust the ERASE PEAK preset for maximum output and proceed as follows:
 - a. Slowly adjust the core of T4 and note that there are two distinct peaks in the vu meter indication with a slight dip in the meter reading. Set the core of T4 so that the meter is reading at the center of the dip.
 - b. Repeat step a for T3.
 - c. Check that ERASE PEAK is still set to give maximum output.
4. The bias level should now be reset (as described in Record Alignment Produce), together with the BIAS CAL preset.

NOTE

If a large readjustment to the bias level is necessary, step 3 should be repeated.

5. Remove the extender card and replace the bias amplifier in the electronics chassis.
6. If necessary, recheck the second harmonic distortion at this time.

BIAS AND ERASE AMPLIFIER ADJUSTMENT FOR 24 CHANNEL SYSTEMS

1. Prepare the machine as follows:
 - a. Place the bias amplifier card of the channel to be aligned on an extender board (Ampex part no. 4020153-01).
 - b. Place the NORMAL/SET UP/BIAS switch in BIAS.
 - c. Place the channel READY/SAFE switch in READY.
 - d. Remove tape from the transport and temporarily secure the end-of-tape switch in the on position.
2. Place the transport in record mode and proceed as follows:
 - a. Adjust the BIAS CAL preset on the bias amplifier card to obtain a $2/3$ -scale reading on the vu meter.
 - b. Adjust the core of T3 (nearest connector) to achieve maximum reading on the vu meter.
 - c. Repeat this procedure for the core of T4 (furthest from connector).
3. Turn the ERASE PEAK preset fully counterclockwise and proceed as follows:
 - a. Turn the ERASE PEAK preset slowly clockwise. The bias level indication will change very slowly at first. Then the vu meter will indicate a sudden 2 to 3 dB drop. Continue turning the preset clockwise until the vu meter reading is reduced another 0.5 to 1 dB below the initial drop.
 - b. Leave T3 and T4 cores in their peaked positions as per step 2.
4. The bias level should now be reset (as described in record alignment), together with the BIAS CAL preset.

NOTE

If a large readjustment to the bias level is necessary, step 3 should be repeated.

5. Remove the extender card and replace the bias amplifier in the electronics chassis.
6. If necessary, recheck the second harmonic distortion at this time.

PARTS LISTS

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Reel Motor Assembly	4030375-	65
Solenoid Assembly	13954D	67
Reel Hold Down Assembly	1243031D	69
End-of-Tape Arm and Housing Assembly	4030377-	71
Tape Lifter Assembly	4030379A	73
Tension Sensor, Assembly	4030384A	75
Cable Assembly, Erase Head	4050686A	77
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Cable Assembly, Record Head	4050688A	81
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Audio Switching PWA	4050690A	93
Harness, Electronics Chassis	4050691-	95
Harness, Head and Input Cabling	4050704-	97
Head Assembly, 2 Inch	4020372-	99
Transport Control Chassis	4020373A	101
Capstan Servo PWA	4050692B	103
Transport Control PWA	4050706-	105
Motor Drive Amplifier Assembly	4020374-	107
Motor Drive Amplifier PWA	4050698-	109
Fan Assembly	4020379	111
Frame Assembly	4030383A	113
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Input/Output Connector Panel (8 and 16-Channel)	4050685-	123
Meter Panel Assembly	4050707-	125
Meter Panel Cable Assembly	4050682-	127
Input/Output Connector Panel (24-Channel)	4050715-	129
Motion Sense Assembly	4952610D	131
Miscellaneous Spare Parts Kit	4090024A	133

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4020373A	Transport Control	101
4020374-	Motor Drive Amplifier	107
4020379-	Fan Assembly	111
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4030375-	Reel Motor Assembly	65
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NUMERICAL INDEX TO PARTS LISTS (Continued)

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4050682-	Cable Assembly, Meter Panel	127
4050685-	Input/Output Connector Panel (8 and 16-Channel)	123
4050686A	Cable Assembly, Erase Head	77
4050687-	Cable Assembly, Reproduce Head	79
4050688-	Cable Assembly, Record Head	81
4050690A	Audio Switching PWA	93
4050691-	Harness, Electronics Chassis	95
4050692B	Capstan Servo PWA	103
4050698-	Motor Drive Amplifier PWA	109
4050699A	Regulator/Oscillator PWA	117
4050704-	Harness, Head and Input Cabling	97
4050706-	Transport Control PWA	105
4050707-	Meter Panel Assembly	125
4050708-	Harness Assembly, Tape Transport	83
4050715-	Input/Output Connector Panel Assembly (24-Channel)	129
4090024A	Miscellaneous Spare Parts Kit	133
4952610D	Motion Sense Assembly	131

REC-PLAY-FWD-REW-SWITCHES
PART # 513-1809-001

820-3777

WESTERN ELECTROMOTIVE - SHEPPERD
CULVERCITY

(OR)
ELECTRONIC SWITCHES (GLENDALE)

RICHEY ELECTRONICS (SUN VALLEY) - 875-2862

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER					
				-01	-02	-03	-04	-05	-06
1	402034-01	HEAD ASST, 8 CHANNEL							
2	4020269-06	REGG. EQUALIZER, CEIR (1FC)		2		8	16	24	
3	4020360-01	TRANSPORT ASSY		1		1			
4	4020360-02	TRANSPORT ASSY		1		1			
5	4020360-03	TRANSPORT ASSY		1		1			
6	4020269-08	REGG. EQUALIZER, DMC		8	16	24			
7	4020371-02	ELECTRONICS ASSEMBLY		2	4	6	2	4	6
8	4020270-02	REFERENCE EQUALIZER, 1P2		8	16	24			
9	4020372-01	HEAD ASST, 16 CHANNEL							
10	4020372-02	HEAD ASST, 24 CHANNEL							
11	4290255-01	COVER, POWER SUPPLY							
12	4020373-01	TRANSPORT CONTROL ASSY, 8 - 16 CH.		1	1	1	1	1	1
13	4020373-02	TRANSPORT CONTROL ASSY, 24 CH.							
14									
15	4020374-01	MOTOR DRIVE AMPLIFIER ASSY		1	1	1	1	1	1
16									
17	4020379-01	FAN ASSY		1	1	1	1	1	1
18									
19	4020383-01	FRAME ASSEMBLY		1	1	1	1	1	1
20									
21	4020387-01	DOOR ASSY		1	1	1	1	1	1
22	4020387-02	DOOR ASSY		1	1	1	1	1	1
23									
24	4050646-01	CONTROL BOX ASSY, 8 CH.		1		1			
25	4050646-02	CONTROL BOX ASSY, 16 CH.		1		1			
26	4050646-03	CONTROL BOX ASSY, 24 CH.		1		1			
27									
28	4050647-02	CIRCUIT BREAKER ASSY		1	1	1	1	1	1
29	4050658-01	POWER SUPPLY, 39 VOLT		1	1	1	1	1	1
30	4050658-02	POWER SUPPLY, 15/27 VOLT		1	1	1	1	1	1
31									
32	4050685-01	INPUT/OUTPUT COMM. PANEL ASSY, CH 1-8		1		1			
33	4050685-02	INPUT/OUTPUT COMM. PANEL ASSY, CH 1-16		1		1			
34									
35	4050707-01	METER PANEL ASSY, 8 CH		1		1			
	4050707-02	METER PANEL ASSY, 16 CH		1		1			
37	4050707-03	METER PANEL ASSY, 24 CH		1		1			

Sheet 1 of 3

4010210C
Master Maker Assembly

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER					
				-01	-02	-03	-04	-05	-06
38									
39	4050709-01	CABLE ASSY, ELECTRONICS PWR & CONTROL		1	2	3	1	2	3
40									
41	4050710-01	DUMMY PLUG ASSY, REMOTE CONTROL		1	1	1	1	1	1
42									
43	4050715-01	INPUT/OUTPUT COMM. PANEL ASSY, CH 1-24							
44									
45	4050824-01	MISCELLANEOUS PARTS KIT		1		1			
46	4050824-02	MISCELLANEOUS PARTS KIT							
47	4050824-03	MISCELLANEOUS PARTS KIT							
48	4170309-01	LABEL, ELECTRONICS CHASSIS, CH 1-4		1	1	1	1	1	1
49	4170309-02	LABEL, ELECTRONICS CHASSIS, CH 5-8		1	1	1	1	1	1
50	4170309-03	LABEL, ELECTRONICS CHASSIS, CH 13-16		1	1	1	1	1	1
51	4170309-04	LABEL, ELECTRONICS CHASSIS, CH 17-20		1	1	1	1	1	1
52	4170309-05	LABEL, ELECTRONICS CHASSIS, CH 17-20							
53	4170309-06	LABEL, ELECTRONICS CHASSIS, CH 21-24							
54									
55	4290825-05	PANEL, SIDE		1		1		1	1
56	4290825-06	PANEL, SIDE		1		1		1	1
57	4290825-07	PANEL, SIDE, 24 CHANNEL							
58	4290825-08	PANEL, SIDE, 24 CHANNEL							
59									
60	4290836-01	PANEL, BLANK 8" (24")		2	2	2	2	2	2
61	4290836-02	PANEL, BLANK 8 1/4" (24")		1		1		1	1
62	4290902-01	PANEL, FILLER, REAR		1	1	1	1	1	1
63	4290917-01	PANEL, FILLER 24 CH							
64									
65	4290919-01	PLATE, SPACER		1	1	1	1	1	1
66									
67									
68									
69									
70	4922410003	MOTION SPRING ASSY							
71									
72									
73									
74	4050231	INSTRUCTION MANUAL		1	1	1	1	1	1
75	4102273-77	LABEL, IDENTIFICATION		1	1	1	1	1	1
76									
77									
78									
79	470-039	SCREEN, #8-32 X .50 LG. CAP HEX SOCKET HD		4	4	4	4	4	4
80	470-040	SCREEN, #10-32 X .75 LG. CAP. HEX SOCKET HD		3	3	3	3	3	3
81									
82									

4010210C

Sheet 2 of 3

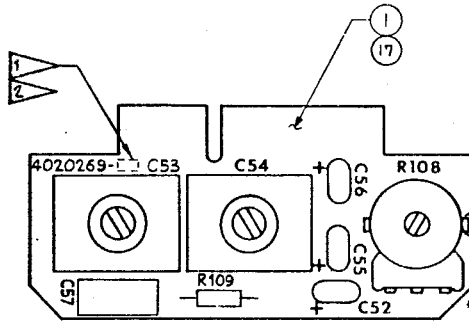
ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER					
				-01	-02	-03	-04	-05	-06
81	471-069	SCREW, #6-32 X .375 LG, PAN HD, XREC		5	5	5	5	5	5
84	471-080	SCREW, #8-32 X .50 LG, PAN HD, XREC		6	6	6	6	6	6
85	471-462	SCREW, #12-24 X .75 LG, PAN HD, XREC		4	4	4	4	4	4
86									
87									
88	472-718	SCREW, #10-32 X .75 LG, DMVL HD, XREC, NML P/LD		44	44	44	44	44	44
89	473-624	SCREW, #10-32 X 1.25 LG, FLAT HD, XREC		4	4	4	4	4	4
90									
91									
92									
93	501-009	WASHER #6 PLAIN		5	5	5	5	5	5
94	501-205	WASHER #8 PLAIN		10	10	10	10	10	10
95	501-702	WASHER #10 FINISHING, NYLON, BLACK		44	44	44	44	44	44
96									
97	502-005	WASHER #10, LOCK, SPRING		3	3	3	3	3	3
98	502-025	WASHER #6, LOCK, INTL TOOTH		5	5	5	5	5	5
99	502-026	WASHER, #8, LOCK, INTL TOOTH		10	10	10	10	10	10

ITEM NO	PART NUMBER	C	DESCRIPTION	REF DESIG	QTY REQ PER ASSY NUMBER			
					401-02-003	404	405-06-07	408
1	4500109-02		PRINTED WIRING BOARD		1	1	1	1
2	4520153-01		RESISTOR, VARIABLE (100K OHMS)	R100	1	1	1	1
3	4540311-02		CAPACITOR, TRIMMER (50-380PF)	C54	1	1	1	1
4	4540314-03		CAPACITOR, TRIMMER (170-780PF)	C53	1	1	1	1
5	4540314-03		CAPACITOR, TRIMMER (170-780PF)	C54	1	1	1	1
6	4540314-04		CAPACITOR, TRIMMER (300-1180PF)	C53	1	1	1	1
7	037-654		CAPACITOR, TANT. (3.3UF, 35V, 20%)	C52	1	1	1	1
8	037-654		CAPACITOR, TANT. (3.3UF, 35V, 20%)	C55	1	1	1	1
				C56	1	1	1	1
9	4840189		SCHEMATIC	REF REF REF	1	1	1	1
10	055-154		CAPACITOR, MYLAR, .0022UF, 50V, 10%	C57	1	1	1	1
11	047-435		RESISTOR, FIXED, 1/4W, 1/2%, 5%	R103	1	1	1	1
12	037-654		CAPACITOR, TANT. (3.3UF, 35V, 20%)	C55	1	1	1	1
13	4540314-03		CAPACITOR, TRIMMER (5-280 PF)	C54	1	1	1	1
14	4540314-03		CAPACITOR, TRIMMER (50-380PF)	C53	1	1	1	1
15	4500156-01		PRINTED WIRING BOARD		1	1	1	1
16	4840253		SCHEMATIC	REF REF REF	1	1	1	1
17	4500156-02		PRINTED WIRING BOARD		1	1	1	1
18	4520153-07		POTENTIOMETER, RECORD CALIBRATION	R108	1	1	1	1
19	4540337		SCHEMATIC	REF REF REF	1	1	1	1

4020269G

Record Equalizer PWA

Next Assy: 4010210



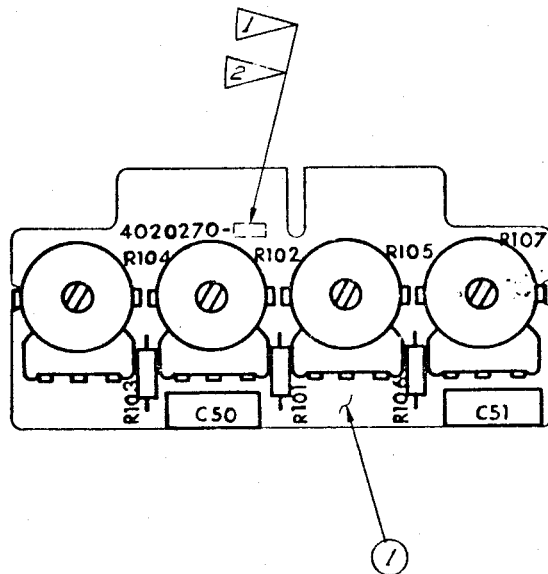
NOTES:

- 1 ASSEMBLY NUMBER TO BE 4020269 - XX.
- 2 MARK DASH NUMBER PER BDI-1.

4020269G
Record Equalizer PWA

Sheet 2 of 2

Next Assy: 4010210



NOTES:

- 1. PART NO. IS 4020270-1X
- 2. INK STAMP DASH NO. PER MIL. STD. 130.

QTY	REF	QTY	PART NUMBER	DESCRIPTION	LOCATIONS
	9	1	4840259	SCHEMATIC	
2	8	1	055-889	CAPACITOR, .0033 MFD MYLAR	C50, 51
	7	1	4840169	SCHEMATIC	
2	6	1	055-222	CAPACITOR, .0047 MFD, MYLAR	C50, 51
1	5	1	049-527	RESISTOR, 2.2K, 1/8 W, 10%	R101
2	4	2	049-528	RESISTOR, 220K, 1/8 W, 10%	R103, 106
2	3	1	C-4520152-02	POTENTIOMETER, 2.5 MEG	R102, 107
2	2	2	C-4520152-01	POTENTIOMETER, 50 K	R104, 105
1	1	1	D-4500110-01	PRINTED WIRING BOARD, REP. EQUAL.	

LIST OF MATERIALS

4020270C
Reproduce Equalizer PWA

Sheet 1 of 1

Next Assy: 4010210

ITEM NO	PART NUMBER	DESCRIPTION	QTY	REF DISG	QTY REQ PER DASH N. 402360
1	4030328-05	CAPSTAN DRIVE ASSY	1	1	1
2	4030369-01	CAPSTAN IDLER HOUSING ASSY	1	1	1
3	4030375-01	TAKE-UP REEL ASSY	1	1	1
4	4030375-02	SUPPLY REEL ASSY	1	1	1
5	4030377-01	EMP-OF-TAPE ARM & HOUSING ASSY	1	1	1
6	4030379-01	TAPE LIFTER ASSY	1	1	1
7	4030384-01	TOP PLATE ASSY	1	1	1
8	4030384-01	TENSION SENSOR ASSY	1	1	1
9	4030384-01	ARMRESS, TAPE TRANSPORT	1	1	1
10	4100048-81	CAP. TENSION ARM	1	1	1
11	4110283-01	OVERLAY, TRANSPORT	1	1	1
12					
13	4041181-01	ARM ASSY, TENSION SENSOR	1	1	1
14	4220128-01	BLOCK, MOUNTING, TENSION SENSOR	1	1	1
15	4210353-01	GUIDE, 1 INCH FIBER	2	-	-
16	4220297-01	SPACER, TRANSPORT	3	3	-
17	4220353-02	GUIDE, 2 INCH FIBER	2	2	2
18	4230148-01	ARM, PHOTOCELL COVER	1	1	1
19	4230294-01	SPACER, HEAD CABLE CLAMP	2	2	2
20	4230305-01	SPACER, TRANSPORT	-	-	-
21	4250229-01	RING, SPACER, SERVO MOTOR	1	1	1
22					
23	41371-01	BRACKET, SPRING	1	1	1
24	59102-05	TAPE TIMER ASSY	1	1	1
25	1024-01	SPRING, TAKE UP TENSION	1	1	1
26	4270331-01	SPRING, SENSOR	1	1	1
27	4290797-01	COVER, TENSION SENSOR	1	1	1
28	4290819-01	SHIELD, TRANSPORT	1	1	1
29	13871-02	ARM, SOLENOID	1	1	1
30	4290804-01	SOLENOID MOUNTING	1	1	1
31	4290804-01	SOLENOID	1	1	1
32	4290804-01	SOLENOID	1	1	1
33	4290812-01	PLATE, BACKING	1	1	1
34	4290812-01	SOLENOID	1	1	1
35	4290812-01	DASHPOT	1	1	1
36	474-052	SCREW, SHOULDER #10-32 X .250 LG	2	2	2
37	474-055	SCREW, CAP. #10-32 X 1/2 LG	1	1	1

4020360—
Transport Assembly

Next Assy: 4010210

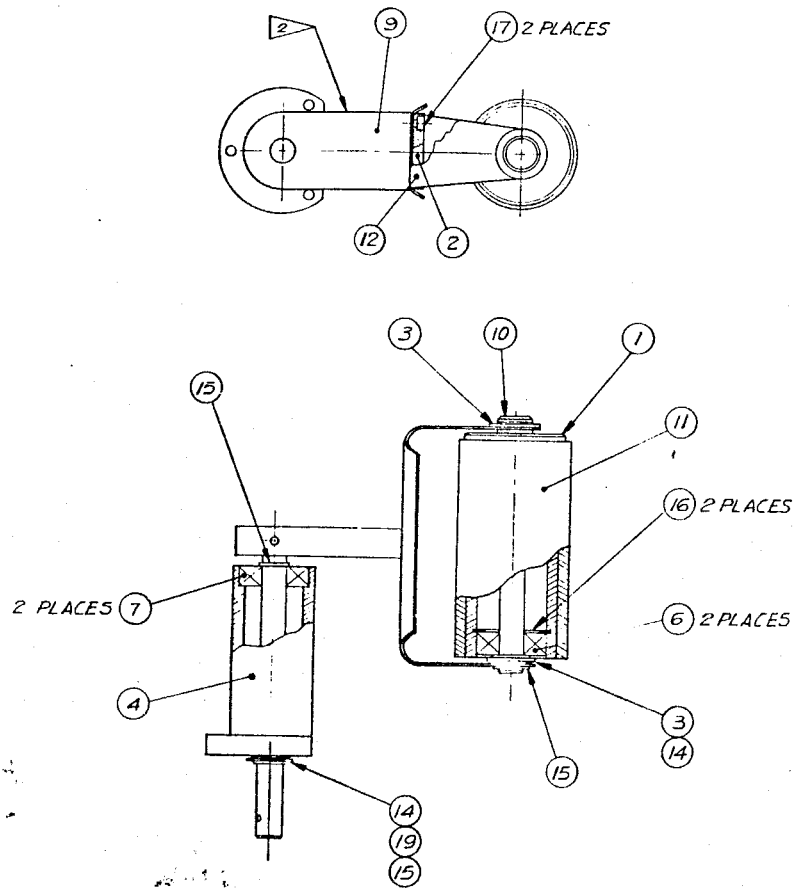
Sheet 1 of 3

ITEM NO	PART NUMBER	DESCRIPTION	QTY	REF DISG	QTY REQ PER DASH N. 402360
38	4952589-01	ARM ASSY, DASHPOT	1	1	1
39	4952610-03	MOTION SENSE ASSY	1	1	1
40					
41	6000035-02	LABEL, IDENTIFICATION	1	1	1
42	50115-04	SLEEVE, BUMPER, TAPE TENSION ARM	2	2	2
43	55570-04	CAPSTAN SOLENOID ASSY	1	1	1
44	59102-05	TAPE TIMER ASSY	1	1	1
45	4600153-01	CLAMP, HEAD CABLE	1	-	-
46	4600153-03	CLAMP, HEAD CABLE	-	-	-
47	4600153-05	CLAMP, HEAD CABLE	-	-	-
48	4600153-02	CLAMP, HEAD CABLE	1	-	-
49	4600153-04	CLAMP, HEAD CABLE	-	-	-
50	4600153-06	CLAMP, HEAD CABLE	-	-	-
51	032-084	BOOT, CAPACITOR	2	2	2
52	036-126	CAPACITOR, FIXED, 10 uF, 330V	2	2	2
53					
54	120-062	SWITCH, SENSITIVE LEVER	1	1	1
55	120-074	SWITCH, SENSITIVE PUSHBUTTON	1	1	1
56	290-111	BRACKET, CAPACITOR, GE 49827065P21	2	2	2
57	225-353	TAPE, ADHESIVE, ONE SIDE, .031 THK X .500 W	M/R	M/R	M/R
58					
59	406-030	PIN, SPRING, ROLL .125 DIA X .625 LG	1	1	1
60					
61	302-365	CLAMP, CABLE	8	8	8
62					
63					
64					
65	470-181	SCREW, CAP HEX SOC, #10-24 X 1.50 LG	4	4	4
66	470-021	SCREW, CAP, #6-32 X .62 LG, HEX SOC	5	5	5
68	470-089	SCREW, CAP, #10-32 X .50 LG, HEX SOC	12	12	12
69	470-028	SCREW, CAP, #8-32 X .44 LG, HEX SOC	8	8	8
70	470-019	SCREW, CAP, #5-32 X .44 LG, HEX SOC	4	4	4
71	470-160	SCREW, CAP, #6-32 X 1.25 LG, HEX SOC	2	2	2
72	470-016	SCREW, CAP, #6-32 X .25 LG, HEX SOC	1	1	1
73	470-503	SCREW, CAP, #8-32 X .37 LG, HEX SOC	1	1	1
74	471-112	SCREW, PAN HD #6-32 X .37 LG, ARCC	8	8	8
75	471-117	SCREW, PAN HD #6-32 X .25 LG, ARCC	1	1	1
76	471-132	SCREW, PAN HD #10-32 X .50 LG, ARCC	4	4	4
77	470-033	SCREW, CAP HEX #10-32 X .62 LG, HEX SOC	3	3	3
78	471-858	SCREW, PAN HD #8-32 X 2.25 LG, ARCC	2	2	2
79	471-130	SCREW, PAN HD #8-32 X .50 LG, ARCC	4	4	4
80					
81	4800316	SCHEMATIC, TRANSPORT	REF	REF	REF
82					

4020360—

Sheet 2 of 3

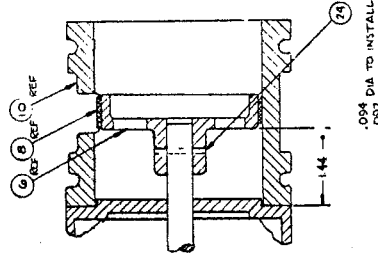
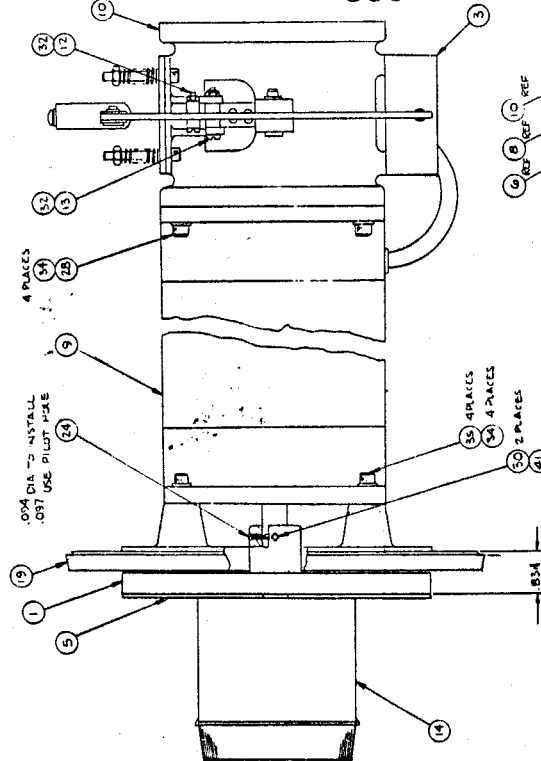
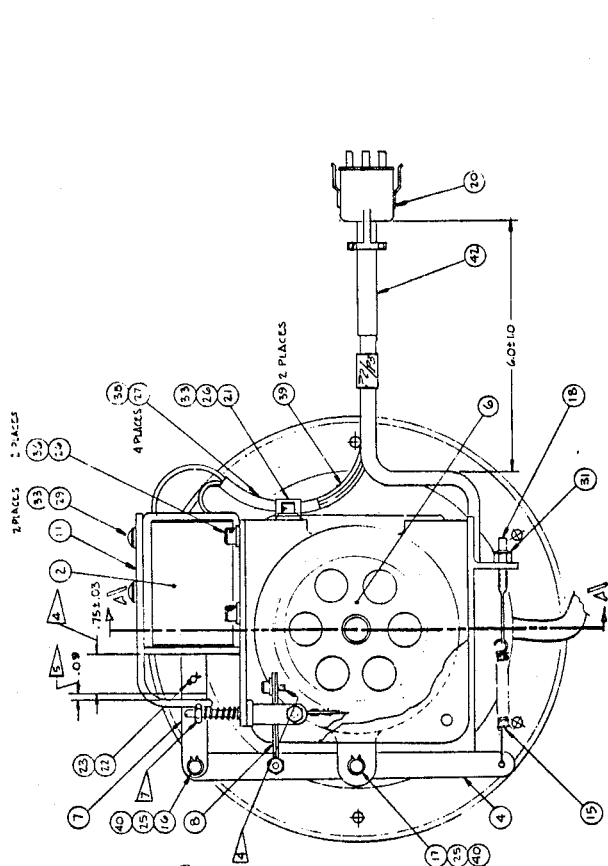
ITEM NO	PART NUMBER	DESCRIPTION	QTY REQD PER DASH NUMBER		
			01	02	03
83					
84	501-002	WASHER, #6, PLAIN	21	21	21
85	501-070	WASHER, #10, PLAIN	13	13	13
86	501-205	WASHER, #8, PLAIN	11	11	11
87	501-681	WASHER, #8, PLAIN	4	4	4
88					
89					
90					
91					
92					
93	502-003	LOCKWASHER, #6, SPRING	12	12	12
94	502-004	LOCKWASHER, #8, SPRING	9	9	9
95	502-005	LOCKWASHER, #10, SPRING	9	9	9
96					
97					
98	502-025	WASHER #6, INTERNAL TOOTH	9	9	9
99	502-026	WASHER #8, INTERNAL TOOTH	6	6	6
100	502-027	WASHER #10, INTERNAL TOOTH	4	4	4
101					
102					
103					
104	4050686-01	CABLE ASSY, ERASE HEAD	1	1	1
105	4050686-02	CABLE ASSY, ERASE HEAD	-	1	1
106	4050686-03	CABLE ASSY, ERASE HEAD	-	-	1
107					
108	4050687-01	CABLE ASSY, REPRD HEAD	1	1	1
109	4050687-02	CABLE ASSY, REPRD HEAD	-	1	1
110	4050687-03	CABLE ASSY, REPRD HEAD	-	-	1
111					
112					
113	4050688-01	CABLE ASSY, RECORD HEAD	1	1	1
114	4050688-02	CABLE ASSY, RECORD HEAD	-	1	1
115	4050688-03	CABLE ASSY, RECORD HEAD	-	-	1



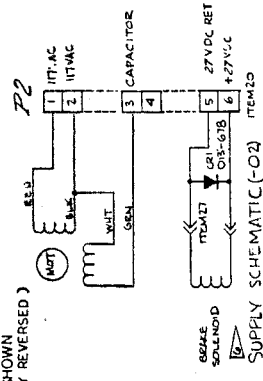
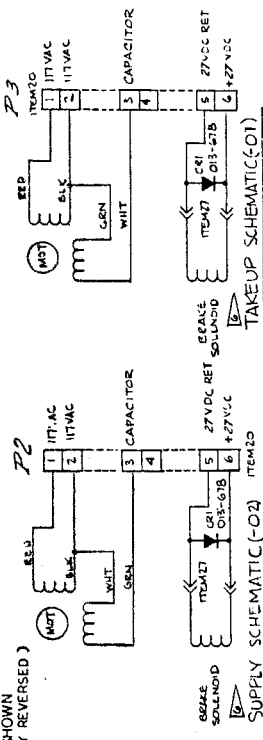
4030369—
 Capstan Idler Housing Assembly

Sheet 2 of 2

Next Assy: 4020360



-01 SHOWN
 (-02 BRAKE ASSY REVERSED)

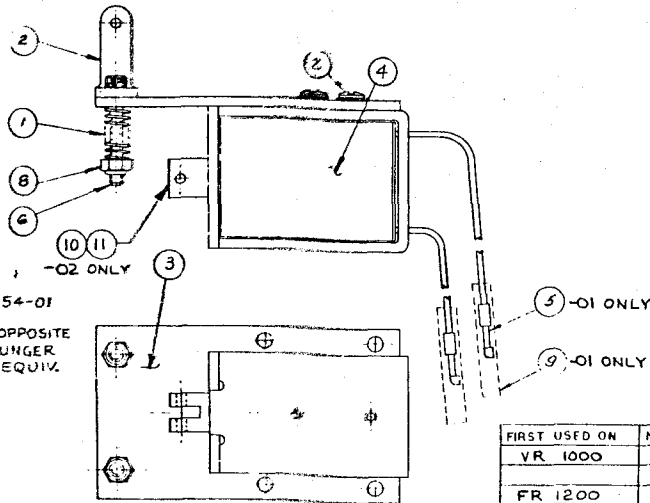


- NOTES**
1. PART NO IS 4030375-XX
 2. MARK PART NO. IN E ED11
 - 3.
 4. ADJUST BRAKE BAND LENGTH TO INDICATED DIMENSION OF SOLENOID PLUNGER WHEN SOLENOID IS DE-ELECTRICATED. DIMENSION IS INDICATED WITH DIMENSIONED CLEARANCE WITH PLUNGER WHEN SOLENOID IS DE-ELECTRICATED.
 5. SUPPLY AND TAKEUP SCHEMATICS DIFFER ONLY IN WIRE TO TERMINAL CONNECTIONS.
 6. ADJUST SPRINGS FOR BRAKE ACTION. HIGH $7\frac{1}{2}$ LB \pm $\frac{1}{2}$ LB, LOW $1\frac{1}{2}$ LB \pm $\frac{1}{2}$ LB. MEASURED AT AN EMPTY REEL HUB.

Sheet 3 of 3

4030375-
 Reel Motor Assembly
 Next Assy: 4020360

MATERIALS LIST						
QTY	OFF	ITEM	ASSEMBLY	QTY. OR MIL.	DESCRIPTION	UNLESS
-02	-01	NO.	PART NO.	NO.		REF. NO.
2		1	B-13817-01		SPRING	
1		2	S-13055-01		BRACKET, BRAKE LIMIT	
1		3	A-13957-00		PLATE, SOLENOID BASE	
1		4	C-14415-01		SOLENOID	
2		5	771-009		CONNECTOR, SOLDERLESS	
2		6	470-124		SCREW, CAP #8-32 X 1/2 LAG	
4		7	475-036		SCREW, (SEM) #8-32 X 3/8 LAG	
2		8	483-007		NUT, SELF LOCKING #8-32	
1		9	600-009		TUBING #4 (208) I.D. BLK. PLASTIC	
1		10	503-030		WASHER, NYLON 1/4 ID X 1/2 OD X 1/32 THK	
NR		11	018-015		ADHESIVE	



NOTES:
 1. ASSY. NO. TO BE 13954-01 OR 13954-02.
 2. MOUNT ITEM 10 TO OPPOSITE END OF SOLENOID PLUNGER USING ITEM 11 OR EQUIV.

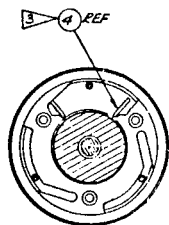
FIRST USED ON	NEXT ASSY	VEESIOJ
VR 1000	13950	-01
	13960	-01
FR 1200	1220303	-02
	1220304	-02
VR 1100	52110	-01
	52111	-01
VR 2000	1210959	-01
	52110	-01

13954D
 Solenoid Assembly

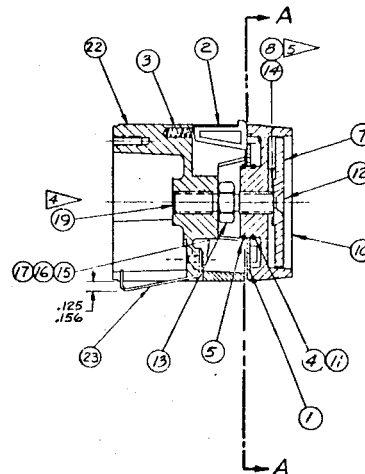
Sheet 1 of 1

Next Assy: 4030375

1					23	1365171-01	SPRING, REEL
1					22	1243035-03	HUB, REEL
-					21	1363321-01	SPRING, REEL
-					20	1243035-02	HUB, REEL
1					19	1243032-02	SHAFT, KNOB
-					18	1360109-04	SPRING, REEL
1					17	471-061	SCREW, PAN HD, PH DR, 4-40 x 5/16 LG.
1					16	501-008	WASHER, FLAT, #4
AR	AR	AR	AR		15	018-030	ADHESIVE, THREAD LOCKING, LOCKTITE GRADE C
AR	AR	AR	AR		14	018-019	ADHESIVE
-					13	392-452	NUT, JAM HEX, 7/16-14
1					12	471-919	SCREW, FLAT HD, HEX SOC, 10-32 x 3/4 LG
AR	AR	AR	AR		11	081-057	GREASE, MOLYLUBE
1					10	1243036	KNOB-REEL
-					9	1243035-01	HUB-REEL
1					8	1243034-01	WASHER
1					7	1243033-01	RETAINER
-					6	1243032-01	SHAFT-KNOB
1					5	52391-01	SPRING-CAM
1					4	1243068-01	SPRING-ENERGIZING
3	3	3	3		3	52366-01	SPRING-FINGER, HOLDDOWN
3	3	3	3		2	52372-01	FINGER-FINGER, HOLDDOWN
1					1	1243069-01	CAM-ACTUATOR
04-15-52-01						PART NUMBER	REV. OPTION
PER EACH ASSY						LIST OF MATERIALS	



SECTION A-A



NOTES:

1. PART NO. IS 1243031-04.
2. MARK PART NO. WITH PREFIX "ASSY" PER BDI-1.
3. COAT CIRCULAR PORTION OF ITEM 4 LIGHTLY WITH ITEM 11 & INSTALL IN ITEM 10. INSTALL ITEM 1 WITH BOSSES OUTSIDE OF THE SPRING LEGS & INSTALL ITEM 5.
4. COAT EXPOSED THDS ON ITEM 19 LIGHTLY WITH ITEM 11.
5. COAT ROUGH SIDE OF ITEM 3 WITH ITEM 14 AND ASSEMBLE TO ITEM 7.

1243031D
Reel Hold Down Assembly

Next Assy: 4030375

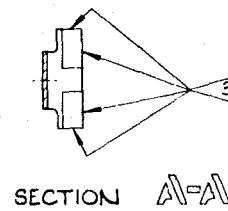
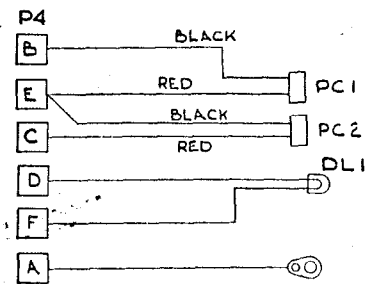
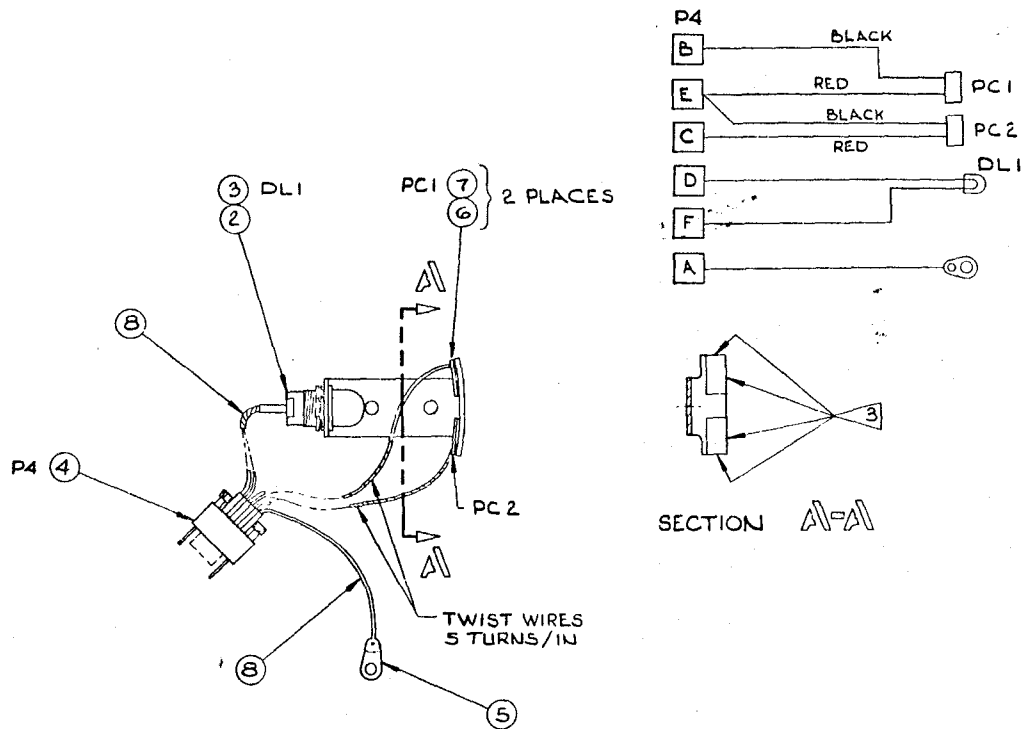
Sheet 1 of 1

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY	REC'D PER CASH NUMBER
1	4041162-01	ARM, BLOCK ASSY		2	
2					
3	4220291-01	STOP, SOLENOID		1	
4					
5	4230254-01	LIME, TAPE LIFTER		1	
6	4320222-01	MOUNTING PLATE, SOLENOID		1	
7					
8	4440312-04	WASHER, FELT		2	
9					
10	027-179	SOLENOID, 24V		1	
11	013-678	DIODE, SILICON		1	
12	180-023	TERMINAL STRIP	TR4	1	
13	352-152	SPRING, .250 OD X 1.00 LG		1	
14					
15	471-353	BEARING SLEEVE, .150 ID X .253 OD X .250 LG		2	
16	466-284	PIN, SPRING ROLL .094 DIA X .50 LG		1	
17					
18					
19					
20	430-090	RETAINING RING		2	
21	501-032	WASHER, .515 ID X .87 OD X .037 THK		1	
22	501-236	WASHER, NYLON, .253 ID X .031 THK		4	
23	471-345	SCREW, FLA, HD #8-32 X .37 LG		4	
24	471-342	SCREW, FLAT HD #8-32 X 1.00 LG		2	
25	471-078	SCREW, PAN HD #8-32 X .37 LG		2	
26	501-009	WASHER, PLAIN #5		2	
27	502-003	WASHER, LOCK #6		2	
28	501-205	WASHER, PLAIN #8		2	
29	502-026	WASHER, LOCK #8		2	
30	492-008	NUT, PLAIN #6-32		2	

4030379A Sheet 1 of 1

Tape Lifter Assembly

Next Assy: 4020360



WIRE LEAD LENGTHS		
FROM	DL 1	2.5
P4	PC 1	5.0
TO	PC 2	3.5
	ITEM 5	2.0

NOTES:

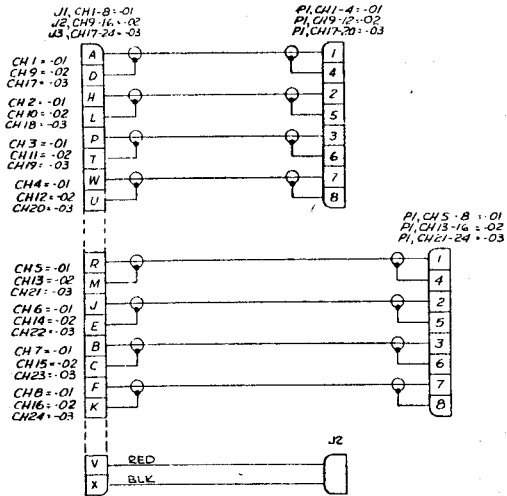
1. PART NO. IS 4030384-01.
2. MARK PART NO. WITH PREFIX "ASSY" PER BDI-1.
3. MOUNT ITEM 7 TO EXTREME EDGES OF ITEM 1 AS SHOWN USING ITEM 6.
4. WIRE LEAD LENGTHS FROM P4 (ITEM 4) SHOWN IN TABLE.

A/R	8	G11-316	WIRE, INS. STRANDED, 22 AWG, BLK
	2	581-204	DICDE, PHOTOVOLTAIC, SELENIUM
A/R	6	225-316	TAPE, DOUBLE-SIDED, VINYL FOAM
	1	172-010	TERMINAL LUG, SOLDER, #6
	1	133-514	CONNECTOR, RECT. PLUG, 8 PIN
	1	132-313	LAMP FIXTURE, INDICATOR, INCANDESCENT
	1	060-373	LAMP INCANDESCENT, 28V, .06 AMP
	1	4260143-01	BKT. MTG, LAMP AND PHOTOCELL

4030384A
Tension Sensor Assembly

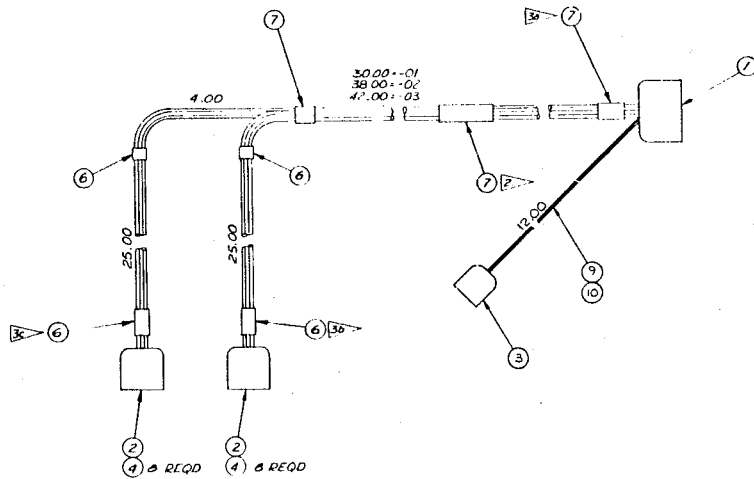
Sheet 1 of 1

Next Assy: 4020360



WIRING DIAGRAM

-	-	1/16	10	617-050	WIRE, STRANDED, INSUL, 20 AWG RED
-	-	1/16	9	611-256	WIRE, STRANDED, INSUL, 20 AWG BLK
1/16	1/16	1/16	8	616-303	CABLE, COAX, 2WAKS
1/16	1/16	1/16	7	600-257	SLEEVING, SHRINKABLE, .500 I.D.
1/16	1/16	1/16	6	600-256	SLEEVING, SHRINKABLE, .375 I.D.
			5		
1/16	1/16	1/16	4	487-037	TERMINAL, QUICK DISCONNECT, FEMALE
-	-	1	3	145-028	CONNECTOR, CIRCULAR, 2 PIN LATCHING
2	2	2	2	166-085	CONNECTOR PART, CONN, ELEC RECP, 2 CONTACTS
1	1	1	1	146-129	CONNECTOR, ELEC RECP, 20 SOCKET
03	02	01			



NOTES:

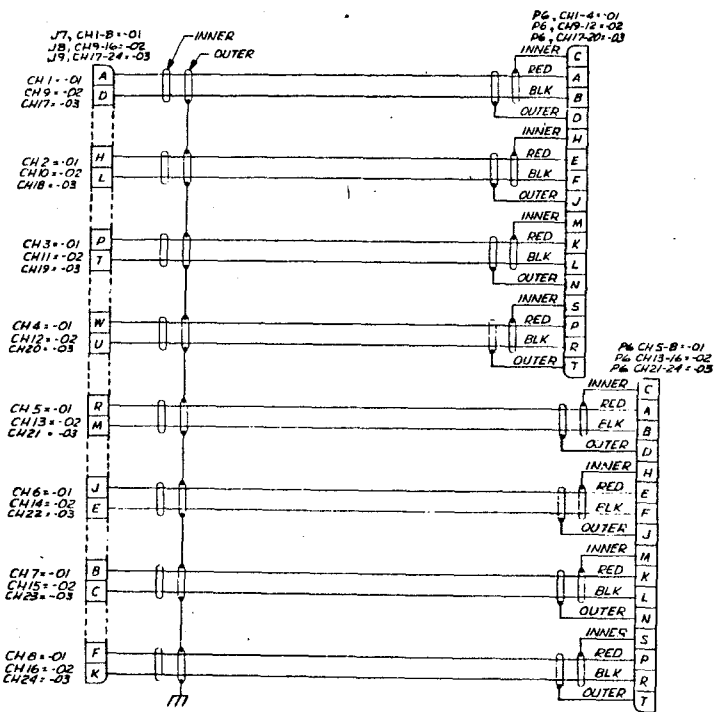
- PART NO. IS 4050686 XX.
 - MARK PART NO. PER BDI-1.
 - MARK REF DES PER BDI-1.
1. -01, MARK "J1, CH1-8" -02, MARK "J2, CH9-16" -03, MARK "J3, CH17-24"
 2. -01, MARK "P1, CH1-4" -02, MARK "P1, CH9-12" -03, MARK "P1, CH17-20"
 3. -01, MARK "P1, CH5-8" -02, MARK "P1, CH13-16" -03, MARK "P1, CH21-24"

4050686A
Erase Head Cable Assembly

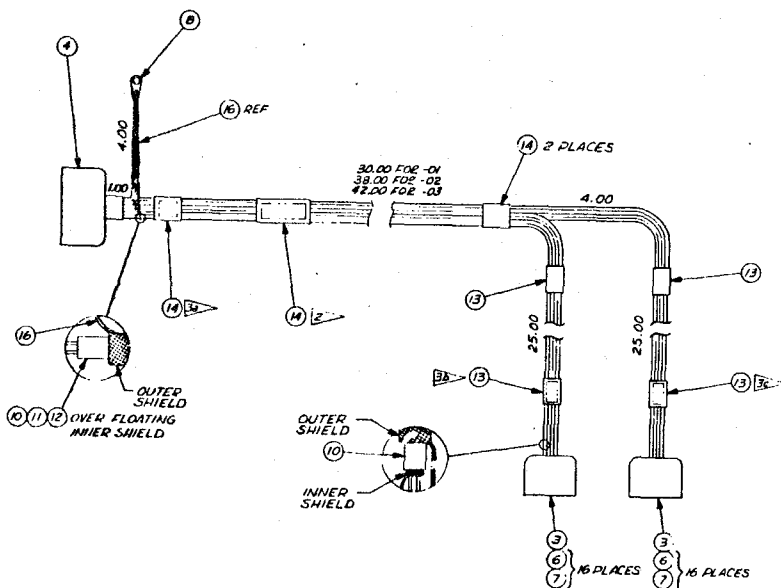
Sheet 1 of 1

Next Assy: 4020360

ITEM NO	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY REQD PER DASH NUMBER		
				-01	-02	-03
1	4700A/75-01	CABLE, HEAD		A/R	A/R	A/R
2						
3	166-854	CONNECTOR PART BODY, RECT RECP, 18 PIN		2	2	2
4	146-129	CONNECTOR, SIGNAL CIRCUIT, RECT RECP, 20 SOCKETS		1	1	1
5						
6	199-080	CONNECTOR PART, CONTACT PIN 14-18 AWG		16	16	16
7	199-086	CONNECTOR PART, CONTACT PIN 24 AWG		16	16	16
8	172-201	TERMINAL LUG, SOLDER, RING TONGUE, #6		1	1	1
9						
10	600-251	SLEEVING, SHRINKABLE, .125 ID		A/R	A/R	A/R
11	600-255	SLEEVING, SHRINKABLE, .250 ID		A/R	A/R	A/R
12	600-256	SLEEVING, SHRINKABLE, .375 ID		A/R	A/R	A/R
13	600-257	SLEEVING, SHRINKABLE, .500 ID		A/R	A/R	A/R
14	600-258	SLEEVING, SHRINKABLE, .750 ID		A/R	A/R	A/R
15						
16	611-208	WIRE, 24 AWG, BLK		A/R	A/R	A/R



WIRING DIAGRAM



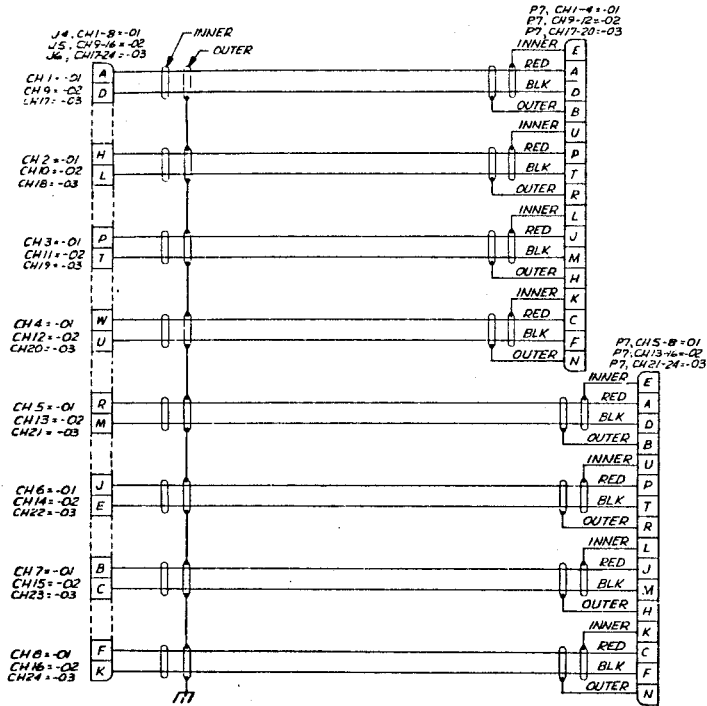
NOTES:

1. PART NO. IS 4050687-XX
2. MARK PART NO. PER BDI-1.
3. MARK REF DES PER BDI-1.
4. -01, MARK "J7, CH1-B" -02, MARK "JB, CH9-16" -03 MARK "J9, CH17-24"
5. -01, MARK "PG, CH1-4" -02, MARK "P6, CH9-12" -03 MARK "P6, CH17-20"
6. -01, MARK "P6, CH5-8" -02, MARK "P6, CH13-16" -03 MARK "P6, CH21-24"

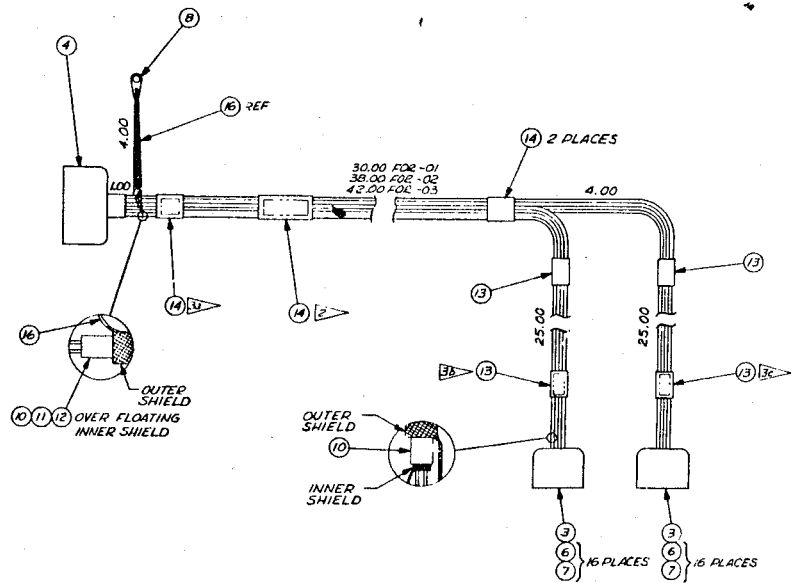
4050687-
 Reproduce Head Cable Assembly

Sheet 2 of 2

Next Assy: 4020360



WIRING DIAGRAM



NOTES:

1. PART NO. IS 4050688-XX
2. MARK PART NO. PER BDI-1.
3. MARK REF DES PER BDI-1.
4. -01, MARK "J4, CH1-B" -02, MARK "J5, CH9-16" -03 MARK "J6, CH17-24"
5. -01, MARK "P7, CH1-4" -02, MARK "P7, CH9-12" -03 MARK "P7, CH17-20"
6. -01, MARK "P7, CH5-B" -02, MARK "P7, CH13-16" -03 MARK "P7, CH21-24"

4050688A
Record Head Cable Assembly

Sheet 2 of 2

Next Assy: 4020360

ITEM NO	PART NUMBER	DESCRIPTION	REF	QTY	RECD PER DASH NUMBER
1	480036	DIAGRAM, HARNESS			
2	4700473-01	CABLE, DOUBLE-SHIELDED, TWISTED PAIR	A/R		
3	4260481-01	BRACKET, CONNECTOR MOUNTING	1		
4	171-515	CONNECTOR, 6 SOC., FEMALE	1A		
5	144-013	CONNECTOR, 6 SOC., FEMALE	J2,3		
6	144-030	CONNECTOR, 15 SOC., FEMALE	P6		
7	144-037	CONNECTOR, 2 SOC., FEMALE	P2		
8	145-020	CONNECTOR, 10 PIN, MALE	P3,4		
9	146-003	CONNECTOR, 8 SOC., FEMALE	J1		
10					
11	166-063	CONNECTOR, 36 SOC., FEMALE	P5		
12	171-009	TERMINAL, QUICK-DISCONNECT, KNIFE	2		
13	171-117	TERMINAL, CRIMP, SPADE TONGUE	9		
14	171-238	TERMINAL, QUICK-DISCONNECT, FEMALE	8		
15	171-001	TERM. CRIMP, SPADE LUG	2		
16	187-037	CONTACT, CONNECTOR, SOCKET	36		
17	171-043	TERMINAL, QUICK-DISCONNECT, FEMALE	7		
18	600-256	SLEEVING, PVC, SHRINKABLE, .375 ID	A/R		
19	600-258	SLEEVING, PVC, SHRINKABLE, .75 ID	A/R		
20					
21	611-158	WIRE, 1MS, STRANDED, 14 AWG, BLK	A/R		
22	611-159	WIRE, 1MS, STRANDED, 14 AWG, BY	A/R		
23	611-363	WIRE, 1MS, STRANDED, 14 AWG, RED	A/R		
24	611-364	WIRE, 1MS, STRANDED, 14 AWG, W/D	A/R		
25	611-498	WIRE, 1MS, STRANDED, 14 AWG, GRN	A/R		
26	611-510	WIRE, 1MS, STRANDED, 14 AWG, ORN	A/R		
27	611-511	WIRE, 1MS, STRANDED, 14 AWG, YEL	A/R		
28	611-512	WIRE, 1MS, STRANDED, 14 AWG, BLU	A/R		
29	613-024	CABLE, SHIELDED, WHI/RED	A/R		
30	613-040	CABLE, SHIELDED, WHI/GRN	A/R		
31	613-055	CABLE, SHIELDED, WHI/YEL	A/R		
32	614-933	CABLE, SHIELDED, WHI/ORN	A/R		
33	616-415	CABLE, SHIELDED, TWISTED PAIR	A/R		
34	CD569	WIRE, 1MS, STRANDED, 16 AWG	A/R		
35	CD569	WIRE, 1MS, ST NDED, 18 AWG	A/R		
36	CD569	WIRE, 1MS, STRANDED, 20 AWG	A/R		
37	CD568	WIRE, 1MS, STRANDED, 22 AWG	A/R		

4050708—

Tape Transport Harness Assembly

Next Assy: 4020360

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQ PER DASH NUMBER
1	166-862	CONNECTOR, BODY, RECT PLUG, 15 PIN		1
2	166-867	CONNECTOR, BODY, RECT 18 SOCKET		1
3	169-083	CONNECTOR, BODY, RECT, 20 SOCKET		1
4	230-099	KNOB		16
5	231-019	BUTTON FLUG		8
6	471-066	SCREW, PAN HD XREC, 1/4 X 3/4 LG		24
7	471-066A	SCREW, PAN HD, XREC, 1/4 X 1/2 LG		24
8	501-008	WASHER, PLAIN # 4		24
9	502-002	LOCK WASHER, SPRING # 4		24
10	496-004	NUT, KEPS # 4		28
11	530-159	GUIDE, P. C. BOARD, EDGE		28
12	530-164	GUIDE, P. C. BOARD, EDGE		1
13	041-006	RESISTOR, COMP, 22K OHMS, 1/4W, 5% RT, 2, 3, 4		4
14	4956591-02	HARNESSELECT. CHASSIS		1
15	4950807-02	PANEL REAR, ELECT		1
16	4950808-02	PANEL TOP, ELECT		1
17	4950812-02	CHASSIS, ELECT		1
18	480193-01	TRANSFORMER, OUTPUT		1
19	031-126	CAPACITOR, ALUM, 250 UF, 50VDC		4
20	083-191	CAPACITOR, QUAD, ALUM, 500 MFD, 50VDC		1
21	180-039	TERMINAL STRIP		4
22	410350-03	SHEET, EXTENDER		4
23	410350-04	SHEET, EXTENDER		12
24	4200312-01	COUPL. INC.		16
25	265-065	BUSHING, SWAP, NYLON, BLK		16

Sheet 1 of 2

4020371C
Electronics Assembly

Next Assy: 4010210

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQ PER DASH NUMBER
38	166-862	CONNECTOR, BODY, RECT PLUG, 15 PIN		1
39	166-867	CONNECTOR, BODY, RECT 18 SOCKET		1
40	169-083	CONNECTOR, BODY, RECT, 20 SOCKET		1
41				
42				
43	230-099	KNOB		16
44	231-019	BUTTON FLUG		8
45	471-066	SCREW, PAN HD XREC, 1/4 X 3/4 LG		24
46	471-066A	SCREW, PAN HD, XREC, 1/4 X 1/2 LG		24
47	501-008	WASHER, PLAIN # 4		24
48	502-002	LOCK WASHER, SPRING # 4		24
49	496-004	NUT, KEPS # 4		28
50	530-159	GUIDE, P. C. BOARD, EDGE		28
51	530-164	GUIDE, P. C. BOARD, EDGE		1
52				
53	041-006	RESISTOR, COMP, 22K OHMS, 1/4W, 5% RT, 2, 3, 4		4
54				
55	4956591-02	HARNESSELECT. CHASSIS		1
56	4950807-02	PANEL REAR, ELECT		1
57	4950808-02	PANEL TOP, ELECT		1
58	4950812-02	CHASSIS, ELECT		1
59	480193-01	TRANSFORMER, OUTPUT		1
60				
61	031-126	CAPACITOR, ALUM, 250 UF, 50VDC		4
62	083-191	CAPACITOR, QUAD, ALUM, 500 MFD, 50VDC		1
63	180-039	TERMINAL STRIP		4
64				
65	410350-03	SHEET, EXTENDER		4
66	410350-04	SHEET, EXTENDER		12
67	4200312-01	COUPL. INC.		16
68	265-065	BUSHING, SWAP, NYLON, BLK		16

4020371C

Sheet 2 of 2

ITEM NO	DWG PART NUMBER	DWG SIZE	D	DESCRIPTION	REF DESIG	QTY	REC'D PER DASH NUMBER
						-01 -03	-04 -05
1	4500104-01	D		PRINTED WIRING BOARD, BIAS AMPLIFIER		1	1
2	4040772-01	C		BUCKET, BIAS EQUALIZATION		1	1
3	4110265-01	B		LABEL, BIAS MODULE		1	1
4	4330261-01	C		FRONT PLATE, BIAS MODULE		1	1
5	4520104-01	C		POT, BIAS CALIBRATE 750 OHMS	44A	1	1
6	4520105-01	B		POT, BIAS ADJUST 25K OHMS	46D	1	1
7	4580103-01	C		COIL, OSCILLATOR	13, 4	2	2
8							
9	417-108			WIRE #24 GA, BUNCH TIMBER, BROWN	A/R	A/R	A/R
10	417-309			WIRE #24 GA, BUNCH TIMBER, RED	A/R	A/R	A/R
11	417-310			WIRE #24 GA, BUNCH TIMBER, ORANGE	A/R	A/R	A/R
12	417-311			WIRE #24 GA, BUNCH TIMBER, YELLOW	A/R	A/R	A/R
13	417-312			WIRE #24 GA, BUNCH TIMBER, GREEN	A/R	A/R	A/R
14	417-313			WIRE #24 GA, BUNCH TIMBER, BLUE	A/R	A/R	A/R
15	034-291			CAPACITOR, MICA, 0.015uF, 500V, 5%	C39	1	1
16							
17				RESISTOR, 200K, 1/2W, 10%	Q16, 17	2	2
18	014-319			TRANSISTOR, 2N102	Q18, 19	2	2
19	014-453			TRANSISTOR, 4PN	Q44	1	1
20	031-190			CAPACITOR, ELEC, 500PF, 25V	C44	1	1
21	034-294			CAPACITOR, MICA, 1500PF, 50V, 5%	C42	1	1
22	034-290			CAPACITOR, MICA, 5000 PF, 100V, 5%	C45	1	1
23							
24	041-031			RESISTOR, FIXED, 1 K5 OHMS, 1/2W, 10%	R00, 91	2	2
25	041-033			RESISTOR, COMP, 22 OHMS, 1/2W, 10%	R07	1	1
26	041-345			RESISTOR, COMP, 51 OHMS, 1/2W, 5%	R03	1	1
27	041-353			RESISTOR, FIXED, 1.6K OHMS, 1/2W, 5%	R06	1	1
28	041-475			RESISTOR, COMP, 3K OHMS, 1/2W, 5%	R04, 85	2	2
29	041-559			RESISTOR, FIXED, 20K OHMS, 1/2W, 5%	R08, 89	2	2
30	055-106			CAPACITOR, MYLAR, IMP, 100V, 10%	C41, 43	2	2
31	055-017			RESISTOR, W.W, 180 OHMS, 5V, 5%	R02	1	1
32	200-131			TRANSISTOR, PNP, .200 DIA.		2	2
33	475-006			SCREW, #4-40 X 1/4 LS, SEN, PAN HD		2	2
34	452-046			NUT, HEX 3/8-32		1	1
35	452-095			NUT, HEX 3/8-32		1	1
36	501-008			WASHER, FLAT, #4		1	1
37	502-028			WASHER, FLAT, INT TOOTH 1/4"		1	1

Sheet 1 of 3

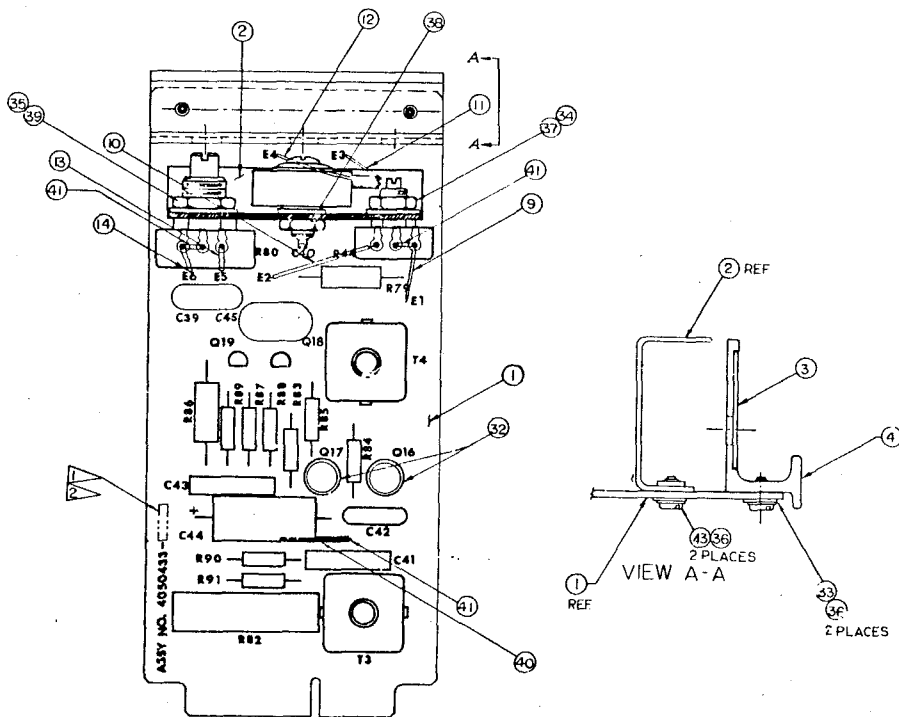
4050433H
Bias Amplifier PWA

Next Assy: 4020371

ITEM NO	DWG PART NUMBER	DWG SIZE	DESCRIPTION	REF DESIG	QTY	REC'D PER DASH NUMBER
					-01 -03	-04 -05
38	502-052		WASHER, FLAT, INT TOOTH #12		1	1
39	502-083		WASHER, FLAT, INT TOOTH 3/8		1	1
40	600-036		TYPING, TELEPHONE		A/R	A/R
41	615-002		WIRE, BARE, SOLID #22 AWG		A/R	A/R
42	034-288		CAPACITOR, MICA, 650 PF, 500V, 5%	C38	1	1
43	475-007		SCREW, #4-40 X 5/16 LG, PAN HD, SEP		2	2
44	018-011		CAPACITOR, VARIABLE, 1.500, -3.055 PF, 250V, CHO		1	1
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81	4610159	0	SCHEMATIC			

Sheet 2 of 3

4050433H



NOTES:
 ▽ ASSY NUMBER TO BE 4050433- <<
 ▽ MARK PART NO PFR BPT 1.

4050433H
 Bias Amplifier PWA

Sheet 3 of 3

Next Assy: 4020371

ITEM NO	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY. REQD PER DASH NUMBER
38	01L-698	TRANSISTOR, SILICON, C0562	3-17	4

Sheet 2 of 3

4050434G

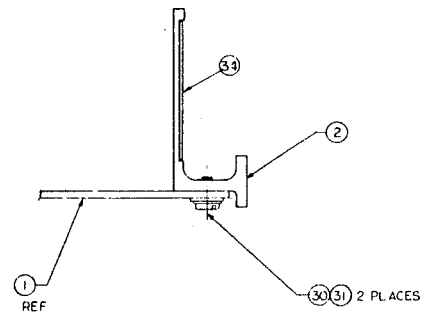
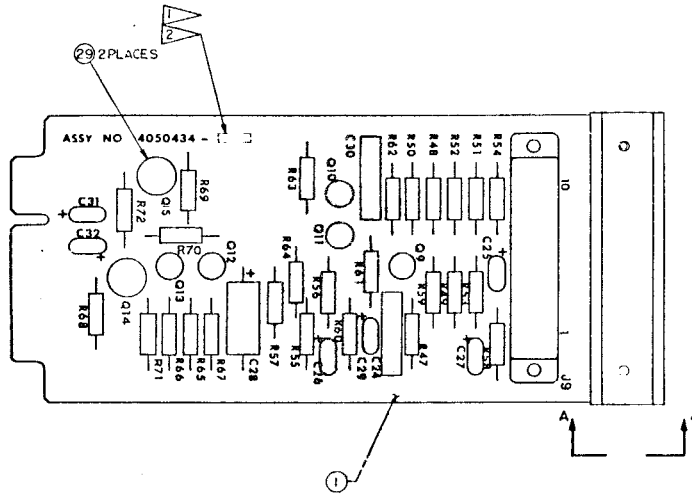
ITEM NO	PART NUMBER	DESCRIPTION	REF. DESIG.	QTY. REQD PER DASH NUMBER
1	450107-01	PRINTED WIRING BOARD		1
2	4330262-01	FRONT PLATE, RECORD MODULE		1
3	01L-697	TRANSISTOR, SILICON, C0562	3-17	4
4	01L-698	TRANSISTOR, SILICON, C0562	3-17	4
5	031-148	CAPACITOR, ELECT. (10UF, 25V)	C28	1
6	037-446	CAPACITOR, TANT. (15UF, 15V, 20%)	C32	1
7	037-446	CAPACITOR, TANT. (47UF, 6V, 20%)	C29, C31	3
8	037-495	CAPACITOR, TANT. (.68UF, 25V, 5%)	C25, C27	2
9	055-106	CAPACITOR, MYLAR (.1UF, 100V, 10%)	C26, C30	2
10	041-012	RESISTOR, FIXED (4.3K OHMS, 1/2W, 5%)	R56, R61	2
11	041-024	RESISTOR, FIXED (110K OHMS, 1/2W, 5%)	R51, R52	2
12	041-038	RESISTOR, FIXED (100 OHMS, 1/2W, 1%)	R57, R72	2
13	041-054	RESISTOR, FIXED (3.3K OHMS, 1/2W, 10%)	R66	1
14	041-060	RESISTOR, FIXED (10K OHMS, 1/2W, 10%)	R55, R60	2
15	041-064	RESISTOR, FIXED (22K OHMS, 1/2W, 10%)	R49, R63	2
16	041-067	RESISTOR, FIXED (39K OHMS, 1/2W, 10%)	R53, R58	2
17	041-068	RESISTOR, FIXED (47K OHMS, 1/2W, 10%)	R69	1
18	041-069	RESISTOR, FIXED (56K OHMS, 1/2W, 10%)	R65	1
19	041-070	RESISTOR, FIXED (68K OHMS, 1/2W, 10%)	R62	1
20	041-072	RESISTOR, FIXED (100K OHMS, 1/2W, 10%)	R57, R64	2
21	041-078	RESISTOR, FIXED (330K OHMS, 1/2W, 10%)	R68	1
22	041-080	RESISTOR, FIXED (470K OHMS, 1/2W, 10%)	R67	1
23	041-082	RESISTOR, FIXED (680 OHMS, 1/2W, 10%)	R70	1
24	041-241	RESISTOR, FIXED (150 OHMS, 1/2W, 10%)	R71	1
25	041-361	RESISTOR, FIXED (7.5K OHMS, 1/2W, 5%)	R54, R59	2
26	041-377	RESISTOR, FIXED (1.3 MEG OHMS, 1/2W, 5%)	R47	1
27	041-698	RESISTOR, FIXED (1.1 MEG OHMS, 1/2W, 5%)	R48	1
28	280-230	TRANSISTOR, PNP		2
29	280-131	TRANSISTOR, PNP		2
30	475-006	SCREW, SEN. PAN HD. (#4-40 x 1/4)		2
31	501-008	WASHER, FLAT #4		2
32	4030270-01	CONNECTOR, ASSY, 10 PIN		1
33	410270-01	CONNECTOR, ASSY, 10 PIN		1
34	410270-01	LABEL, RECORD MODULE		1
35	01L-704	TRANSISTOR, SILICON, C0562	Q13	1
36	01L-578	TRANSISTOR, SILICON, C0513	Q15	1
37	01L-67	TRANSISTOR, SILICON, C038	Q14	1

Sheet 1 of 3

4050434G

Record Amplifier PWA

Next Assy: 4020371



VIEW A-A

NOTES:

- 1 ASSEMBLY NUMBER TO BE 4050434-01
- 2 INK STAMP DASH NUMBER PER *BD/A*.

4050434G
Record Amplifier PWA

Sheet 3 of 3

Next Assy: 4020371

ITEM NO	PART NUMBER	DWG SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER			
					-03	-04	-05	-06 -07 -08
1	4500108-02	B	PRINTED WIRING BOARD, REPRODUCE AMPLIFIER		1	1	1	1
2	4000202-02	B	CONNECTION ASSY, 10 CONTACT	R2	1	1	1	1
3	4100271-01	B	LABEL, REPRODUCE MODULE		1	1	1	1
4	4300265-01	C	FRONT PLATE, REPRODUCE MODULE		1	1	1	1
5	4500109-01	C	TRANSFORMER INPUT	T1	1	1	1	1
6	315-599	D	DIODE	CA1	2	2	2	2
7	014-247	D	TRANSISTOR, MPN, CD38	06	1	1	1	1
8	014-652	D	TRANSISTOR, CD524	05	1	1	1	1
9	014-784	D	TRANSISTOR, CD562	03, 4	2	2	2	2
10	014-608	D	TRANSISTOR, MPN, CD562	Q1, 2	2	2	2	2
11	014-706	D	HEAT SINK, TRANSISTOR		2	2	2	2
12	014-723	D	TRANSISTOR, 2N4077	07	1	1	1	1
13	014-229	D	TRANSISTOR, 2N4102	08	1	1	1	1
14	031-187	D	CAPACITOR, ELEC, (5000, 50V)	08	1	1	1	1
15	071-190	D	CAPACITOR, ELEC, (5000, 25V)	C13	1	1	1	1
16	034-181	D	CAPACITOR, MICA, (47PF, 500V, 5%)	04, 10	2	2	2	2
17	037-454	D	CAPACITOR, TANT, (3.3UF, 35V, 20%)	C2, 3, 7	6	6	6	6
18	037-446	D	CAPACITOR, TANT, (150UF, 15V, 20%)	06, 14	2	2	2	2
19	037-494	D	CAPACITOR, TANT, (470UF, 6V, 20%)	C1, 5	2	2	2	2
20	041-012	D	RESISTOR, COMP, (4.3K OHMS, 1/2W, 5%)	R4	1	1	1	1
21	041-533	D	RESISTOR, FIXED (24 OHMS, 1/2W, 5%)	R30, 31	2	2	2	2
22	041-273	D	RESISTOR, FIXED (270 OHMS, 1/2W, 5%)	R27	1	1	1	1
23	041-046	D	RESISTOR, FIXED (680 OHMS, 1/2W, 10%)	R6, 28	2	2	2	2
24	041-048	D	RESISTOR, FIXED (1K OHMS, 1/2W, 10%)	R1	1	1	1	1
25	041-010	D	RESISTOR, FIXED (2.0K OHMS, 1/2W, 5%)	R29	1	1	1	1
26	041-054	D	RESISTOR, FIXED (3.3K OHMS, 1/2W, 10%)	R10	1	1	1	1
27	041-056	D	RESISTOR, FIXED (4.7K OHMS, 1/2W, 10%)	R24	1	1	1	1
28	041-058	D	RESISTOR, FIXED (6.8K OHMS, 1/2W, 10%)	R8	1	1	1	1
29	041-061	D	RESISTOR, FIXED (12K OHMS, 1/2W, 10%)	R14, 15	2	2	2	2
30	041-062	D	RESISTOR, FIXED (15K OHMS, 1/2W, 10%)	R5, 25	2	2	2	2
31	041-067	D	RESISTOR, FIXED (92K OHMS, 1/2W, 10%)	R2, 21	2	2	2	2
32	041-069	D	RESISTOR, FIXED (76K OHMS, 1/2W, 10%)	R22	1	1	1	1
33	041-072	D	RESISTOR, FIXED (100K OHMS, 1/2W, 10%)	R3, 23, 26	3	3	3	3
34	041-076	D	RESISTOR, FIXED (220K OHMS, 1/2W, 10%)	R12, 13	2	2	2	2
35	041-075	D	RESISTOR, FIXED (180K OHMS, 1/2W, 10%)	R9	1	1	1	1
36	041-080	D	RESISTOR, FIXED (470K OHMS, 1/2W, 10%)	R9	1	1	1	1
37	041-081	D	RESISTOR, FIXED (460K OHMS, 1/2W, 10%)	R18	1	1	1	1

Sheet 1 of 3

4050435U

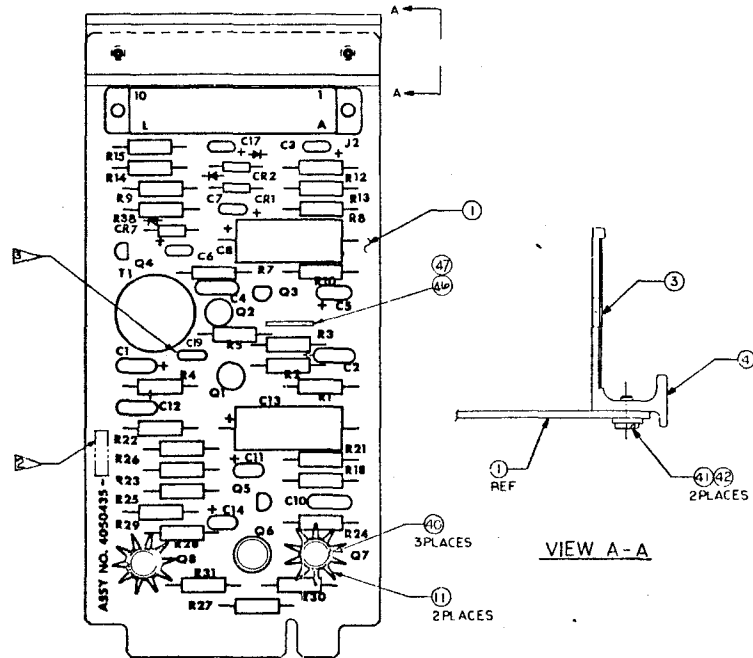
Reproduce Amplifier PWA

Next Assy: 4020371

ITEM NO	PART NUMBER	DWG SIZE	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER			
					-03	-04	-05	-06 -07 -08
38	041-404		RESISTOR, COMP (510 OHMS, 1/2W, 5%)	R26	1	1	1	1
39	560-135		TRANSISTOR, 2N4104	Q1	1	1	1	1
40	280-150		TRANSISTOR, PAD (.200 DIA.)		1	1	1	1
41	475-007		SLEEVE, #4-5/16, SEM. PAN. HD		2	2	2	2
42	501-008		WASHER, #4 FLAT		2	2	2	2
43	103-180		CAPACITOR, MICA, 500V, 39PF, 5%	C19	1	1	1	1
44	014-608		TRANSISTOR, MPN, CD 562	02	1	1	1	1
45	041-046		RESISTOR, 680 OHMS, 1/2W, 10%	R29	1	1	1	1
46	615-012		WIRE, SOLID, BARE, 20 AWG					A/R A/R
47	600-287		SLEEVEING, TEFLON					A/R A/R
48								
49	280-130		MIC. PAD, TRANSISTOR	Q1 REF	1	1	1	1
50	450044-01		TRANSFORMER INPUT	T1	1	1	1	1
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75	4840259		SCHEMATIC	SCHEMATIC				REF REF
76								
77	4840214		SCHEMATIC	SCHEMATIC				REF
78								
79	4840209	D	SCHEMATIC	SCHEMATIC				REF
80								
81	4572229	D	SCHEMATIC	SCHEMATIC				REF
82	4840119	D	SCHEMATIC	SCHEMATIC				REF

4050435U

Sheet 2 of 3



NOTES:

1 PART NUMBER IS 4050435-XX.

MARK DASH No. PER BDI-1.

NOT USED ON -03.

4050435U
 Reproduce Amplifier PWA

Sheet 3 of 3

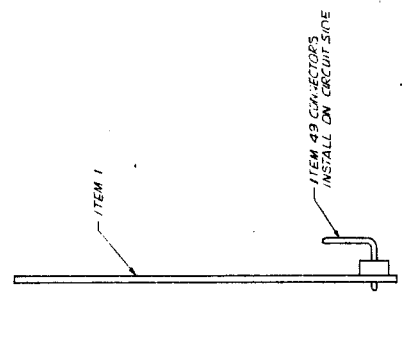
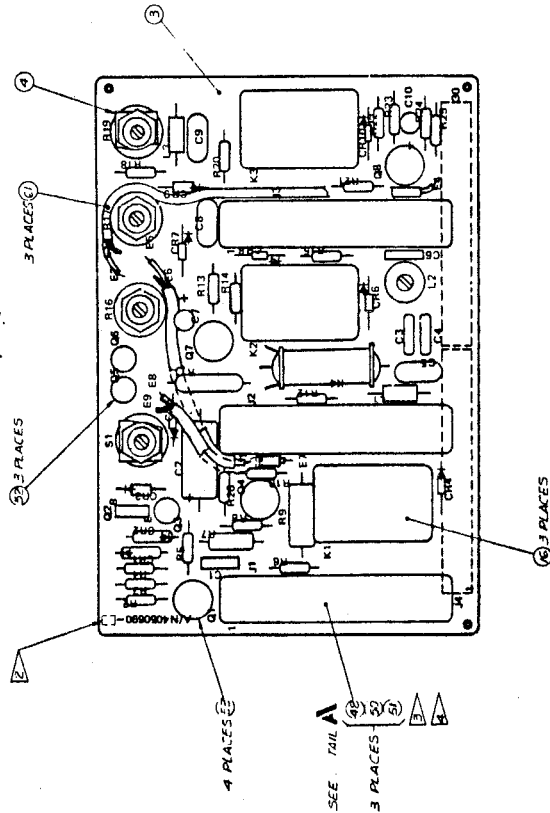
Next Assy: 4020371

ITEM NO	PART NUMBER	DESCRIPTION	P.C.F. DESIG	QTY	REF. DESIG	QTY RECD PER DASH NUMBER
38						
39	051-360	INDUCTOR, FIXED 4.7 MH	L1	1		
40	057-759	RESISTOR, METAL FILM, 3.57K OHMS, 1/4W, 1% R11		1		
41	058 838	RESISTOR, VAR. CARBON, 10K OHMS, 1/2W, 10% R17.19		2		
42	058-837	RESISTOR, VAR. CARBON, 100K OHMS, 1/2W, 10% R18		1		
43						
44						
45	037-980	CAPACITOR, TANT 10 UF, 50 VDC	C2	1		
46						
47	122-465	SWITCH, ROTARY, 3P3T	S1	1		
48	139-512	CONNECTOR, PC RECP, 12 CONTACTS	J1, J2, J3	3		
49	139-513	CONNECTOR, WAFER, RIGHT ANGLE	J4	2		
50	169-818	CONNECTOR PART, POLARIZING KEY		3		
51	225-304	TAPE, ADHESIVE, TEFLON	REF-J1, J2, J3	4		
52	280-130	MTC. PAD, TRANSISTOR (TO-18)	REF-03, 5, 6	3		
53	280-998	MTC. PAD, TRANSISTOR (TO-5)	REF-Q1, 4, 7, 8	4		
54						
55						
56	540-055	INDUCTOR, 10 MH	L3	1		
57	541-133	INDUCTOR, VAR, 220 uH	L2	1		
58						
59	580-394	TRANSISTOR, SILICON PNP, 2N5193	Q2	1		
60						
61	611-055	CABLE, SERD., JACKETS, 1 COND, 26 AWG	47A/R	4		

ITEM NO	PART NUMBER	DESCRIPTION	REF. DESIG	QTY	REF. DESIG	QTY RECD PER DASH NUMBER
1						
2	4840344	SCHEMATIC		1	REF	
3	490208-02	PWB AUDIO SWITCHING		1		
4	426011-02	STRAP, POT SUPPORT		1		
5						
6						
7	011-599	DIODE, SILICON, SMALL SIGNAL, CD458	CR1, 2, 4, 5, 6, 7, 8, 10	8		
8	013-678	DIODE, SILICON, LARGE SIGNAL, CD451	CR3, 9	2		
9						
10	014-247	TRANSISTOR, SILICON, NPN CD38	Q1, 4	2		
11	014-248	TRANSISTOR, SILICON, NPN CD37	Q5, 6	2		
12	014-364	TRANSISTOR, SILICON, PNP CD438	Q7, 8	2		
13	014-383	TRANSISTOR, SILICON, NPN CD441	Q3	1		
14						
15	020-629	RELAY, APPATURE, 4 PDT FORM D	K1, 2, 3	3		
16	020-754	SOCKET, RELAY WITH RETAINING SPRING		2		
17	020-592	RELAY, REED, SPST	K4	1		
18						
19	034-213	CAPACITOR, MICA, 150 PF, 500V, S2	C8	1		
20	034-240	CAPACITOR, MICA, 220 PF, 500V, S2	C5	1		
21	034-237	CAPACITOR, MICA, 110 PF, 500V, S2	C9	1		
22	035-230	CAPACITOR, PLYER, 4700 PF, 50V, S2	C6	1		
23	035-818	CAPACITOR, PLYER, 022 UF, 50V, S2	C1, 3, 4	3		
24						
25	037-908	CAPACITOR, TANT, 4.7 UF, 35V, 20%	C7, 10	2		
26						
27	041-013	RESISTOR, COMP, 4.7K OHMS, 1/2W, S2	R7	1		
28	041-102	RESISTOR, COMP, 1K OHMS, 1/4W, S2	R9	1		
29	041-406	RESISTOR, COMP, 27K OHMS, 1/4W, S2	R12	1		
30	041-468	RESISTOR, COMP, 10K OHMS, 1/4W, S2	R3, 4, 8	3		
31	041-284	RESISTOR, COMP, 100K OHMS, 1/4W, S2	R5, 21, 25	3		
32	041-411	RESISTOR, COMP, 47K OHMS, 1/4W, S2	R10	1		
33	041-437	RESISTOR, COMP, 10K OHMS, 1/4W, S2	R26	1		
34	041-518	RESISTOR, COMP, 33K OHMS, 1/4W, S2	R2, 5, 18	3		
35	041-561	RESISTOR, COMP, 5.1K OHMS, 1/4W, S2	R16, 15, 23, 24	4		
36	041-570	RESISTOR, COMP, 2.4K OHMS, 1/4W, S2	R13, 22	2		
37	041-436	RESISTOR, P, C, K, 18K, 1/4W, S2	R20	1		

Audio Switching PWA

Next Assy: 4020371



COMPONENTS OMITTED FOR CLARITY

DETAIL A

CUT OFF THIS PORTION ON BOTH ENDS

- NOTES:
- 1. PART NO. IS 4050690-03
 - 2. MARK DASH NO. PER BDI-1
 - 3. PUT ITEM 51 IN BETWEEN ITEM 42 AND ITEM 1 PRIOR SOLDERING
 - 4. CONNECTOR KEY POLARIZING
 - J1 POLARIZE: PIN # 5
 - J2 POLARIZE: PIN # 5
 - U3 POLARIZE: PIN # 3

Sheet 3 of 3

4050690A
Audio Switching PWA

Next Assy: 4020371

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQ PER DASH NUMBER
1	166-876	CONTACT, CONN. SPRING TYPE	120	
2	166-882	CONNECTOR, RECT., 36 PIN	J2	1
3	187-036	PIN, MALE MOLEX #1560	N3	
4	187-237	SOCKET, FEMALE MOLEX #1561	N4	
5	166-868	CONNECTOR HOUSING	PA-1,2,3,4	8
6	166-099	CONNECTOR, RECT., 9 PIN	J1	1
7	61A-931	CABLE, SHIELDED 24 AWG, WHT/BRW	A/R	
8	61A-932	CABLE, SHIELDED 24 AWG, WHT/RED	A/R	
9	61A-933	CABLE, SHIELDED 24 AWG, WHT/ORN	A/R	
10	61A-934	CABLE, SHIELDED 24 AWG, WHT/YEL	A/R	
11	61A-935	CABLE, SHIELDED 24 AWG, WHT/GRN	A/R	
12	61A-936	CABLE, SHIELDED 24 AWG, WHT/BLU	A/R	
13	61A-937	CABLE, SHIELDED 24 AWG, WHT/YID	A/R	
14	61A-938	CABLE, SHIELDED 24 AWG, WHT/OT	A/R	
15	166-146	CONNECTOR, RECT., 15 PIN	J5	1
16	616-289	CABLE, TWISTED PAIR, BELDEN B451	A/R	
17	616-303	CABLE, HEAD SHIELDED, MICRODOT 275-3933	A/R	
18	139-511	CONNECTOR, RECT., 12 PIN	JA	1
19				
20	CD568	WIRE, STRANDED, 22 AWG	A/R	
21	CD568	WIRE, STRANDED, 24 AWG	A/R	

Sheet 1 of 1

4050691—
 Electronics Chassis Harness
 Next Assy: 4020371

ITEM NO	PART NUMBER	DESCRIPTION	REF. DESC.		QTY REQD PER DASH NUMBER			
			-01					
1	A700473-01	CABLE, HEAD, DBL SHLD	A/R					
2								
3	166-876	CONTACT, COMM. SPRING TYPE	20					
4								
5	169-152	CONTACT, SOCKET, W/M. 100-100-1C14S	16					
6	169-085	CONTACT, SOCKET, W/M. 100-5102AS	16					
7								
8	187-036	PIN, MALE, MOLEX 1560	24					
9								
10	614-935	CABLE, SHIELDED, 24 AWG, WHT/GRN	A/R					
11	614-936	CABLE, SHIELDED, 24 AWG, WHT/BLU	A/R					
12	614-937	CABLE, SHIELDED, 24 AWG, WHT/YLD	A/R					
13	614-938	CABLE, SHIELDED, 24 AWG, WHT/GR	A/R					
14								
15	600-153	SLEEVING, PLASTIC, SHRINKABLE, BLK 0.135 ID	A/R					
16	600-092	SLEEVING, PLASTIC, SHRINKABLE, BLK 0.250 ID	A/R					
17								
18	615-012	WIRE, 120 AWG, BRN	A/R					
19	616-281	CABLE, TWISTED PAIR, RELODR 6451	A/R					

4050704— Sheet 1 of 2

Head and Input Cabling Harness

Next Assy: 4020371

ITEM NO	PART NUMBER	DESCRIPTION	REF DESC	QTY	RECD	REF DASH NUMBER
				-01	-02	
1	405682-01	PRINTED WIRING ASSY, CARSTAN SERVO		1	1	
2	405706-01	PRINTED WIRING ASSY, TRANSPORT CONTROL		1	1	
3	405695-01	PRINTED WIRING ASSY, EXTENDER CARD		1	1	
4	405695-01	PRINTED WIRING ASSY, EXTENDER CARD		1	1	
5	405695-01	PRINTED WIRING ASSY, EXTENDER CARD		1	1	
6	4290896-01	COVER ASSY, TRANSPORT CONTROL CHASSIS		1	1	
7	4840118	WIRING DIAGRAM, TRANSPORT CONTROL CHASSIS		1	1	
8	4840119	WIRING DIAGRAM, TRANSPORT CONTROL CHASSIS		1	1	
9						
10	143-80A	CONNECTOR, P.C. DUAL, 36 PIN	J1, J2, J4	3	3	
11	146-257	CONNECTOR, 10A PLUG, MACH-10AS	P1	1	1	
12	146-258	CONNECTOR, 10A SOC, MACH-10AS	J6	1	1	
13	147-036	CONNECTOR, CIPHER-JONES, 4 PIN MALE	J3	1	1	
14						
15	166-862	CONNECTOR, MOLEX, PLUG, 36 PIN	J5	1	1	
16	166-863	CONNECTOR, MOLEX, RECEPT, 36 SOC	J5	2	2	
17	169-144	CONTACT, CONNECTOR, SOC, 22 AWG.	J6, P1	140	188	
18	169-318	REF, POLARIZING, P.C. CONN.	REF: J1, J2	2	2	
19						
20	187-036	CONTACT, CONNECTOR, PIN	REF: J5	36	36	
21	187-037	CONTACT, CONNECTOR, SOC	REF: J8-10	72	108	
22	262-007	BUSHING, FLANGED, .750 I.D.		1	1	
23	471-050	SCREW, MACH, PAN HD, REC, 4-40 X 1/4 LG		6	6	
24	471-067	SCREW, MACH, PAN HD, REC, 6-32 X 1/4 LG		4	4	
25	496-005	NUT, KEPS, 6-32		2	2	
26						
27	501-008	WASHER, FLAT, #A		6	6	
28	501-009	WASHER, FLAT, #6		2	2	
29	502-024	WASHER, LOCK, INT, STAR, #A		6	6	
30	502-025	WASHER, LOCK, INT, STAR, #6		2	2	
31						
32	530-159	GUIDE, P.C.		6	6	
33	600-218	SLEEVING, PVC, HEAT SHRINKABLE, .750 I.D.		A/R	A/R	
34	613-02A	CABLE, SHIELDED, WHT/RED		A/R	A/R	
35	613-040	CABLE, SHIELDED, WHT/SPN		A/R	A/R	
36	613-055	CABLE, SHIELDED, WHT/YEL		A/R	A/R	
37	614-933	CABLE, SHIELDED, WHT/DRN		A/R	A/R	

Sheet 1 of 3

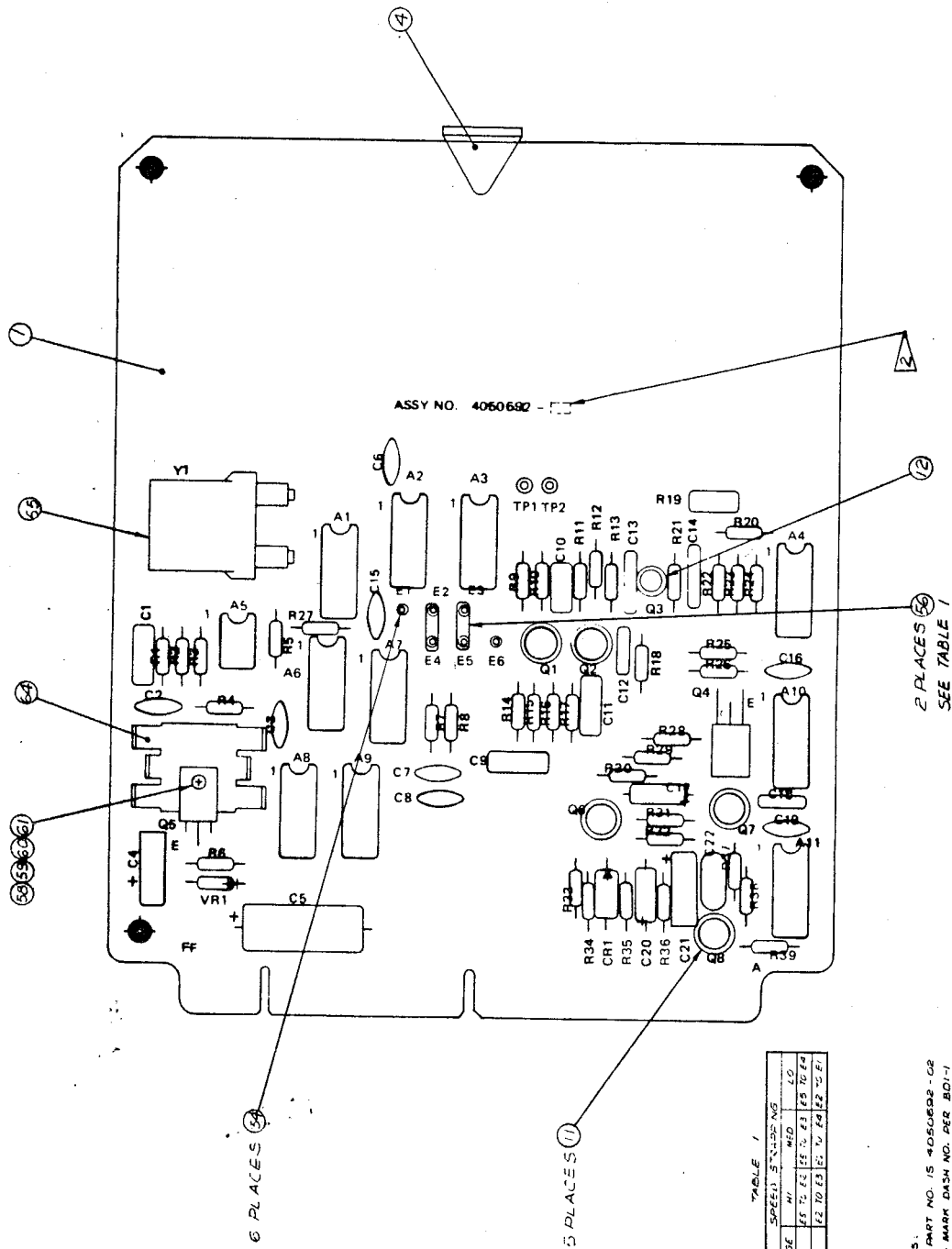
4020373A
Transport Control Chassis

Next Assy: 4010210

ITEM NO	PART NUMBER	DESCRIPTION	REF DESC	QTY	RECD	REF DASH NUMBER
				-01	-02	
38	616-415	CABLE, SHIELDED, TWISTED PAIR		A/R	A/R	
39	615-03B	WIRE, BARE, SOLID, 20 AWG		A/R	A/R	
40	60568	WIRE, INS, STRANDED, 22 AWG		A/R	A/R	
41	60569	WIRE, INS, STRANDED, 20 AWG		A/R	A/R	
42	60569	WIRE, INS, STRANDED, 18 AWG		A/R	A/R	
43	60569	WIRE, INS, STRANDED, 16 AWG		A/R	A/R	
44						
45						
46						
47						
48						
49						
50						
51						
52	4290895-01	CONNECTOR PANEL, TRANSPORT CONTROL		1	1	

4020373A

Sheet 2 of 3



Sheet 3 of 3

4020373A
Transport Control Chassis

Next Assy: 4010210

NOTES:
1. PART NO. IS 4050682-02
2. MARK DASH NO. PER BDI-1

ITEM NO	PART NUMBER	DESCRIPTION	REF. DESIG	QTY. REQ. PER DASH NUMBER
1	4800208-01	PRINTED WIRING BOARD		
2	4800316	SCHEMATIC	REF	
3				
4	52528-01	HANDLE		
5				
6	013-678	DIODE, CD451	CA1	
7	013-693	DIODE, ZENER, .4W, 5.6V, CD32	VA1	
8				
9	014-652	TRANSISTOR, NPN, CD524	Q3, 7	
10	014-698	TRANSISTOR, NPN, CD562	Q1, 2, 6, 8	
11	014-723	MTC. PAD, TRANSISTOR	REF: Q1, 2, 6, 7, 8	
12	280-130	MTC. PAD, TRANSISTOR	REF: Q3	
13	017-122	CRYSTAL, MONITOR, PRODUCTS	Y1	
14				
15	010-957	CAPACITOR, CER. DISC., 0.1UF, 100V, 20%	C2, 3, 6, 5, 15, 16, 19	
16	010-917	CAPACITOR, NPO, 0.1UF, 50V	C1, 9	
17				
18	035-195	CAPACITOR, MYLAR, 500PF, 50V, 5%	C18	
19				
20	034-283	CAPACITOR, MICA, 870PF, 300V, 5%	C22	
21	035-298	CAPACITOR, MYLAR, 0.47UF, 50V, 5%	C11	
22	035-493	CAPACITOR, MYLAR, 0.5UF, 50V, 5%	C13	
23	035-593	CAPACITOR, MYLAR, 0.1UF, 50V, 5%	C14	
24				
25				
26	037-367	CAPACITOR, TANT, 2.2UF, 20V, 10%	C17, 20	
27	037-620	CAPACITOR, TANT, 100UF, 20V, 10%	C5	
28	037-694	CAPACITOR, TANT, 100UF, 10V, 5%	C4, 21	
29	041-482	RESISTOR, COMP, 12K, 1/4W, 5%	R17	
30	041-496	RESISTOR, COMP, 27K, 1/4W, 5%	R18	
31	041-497	RESISTOR, COMP, 3.3K, 1/4W, 5%	R7, 8, 27, 31, 34, 9, 10, 22-24, 32	
32	041-498	RESISTOR, COMP, 100K, 1/4W, 5%	R2	
33	041-510	RESISTOR, COMP, 10K, 1/4W, 5%	R5, 15, 20	
34	041-411	RESISTOR, COMP, 47K, 1/4W, 5%	R2	
35	041-412	RESISTOR, COMP, 4.7K, 1/4W, 5%	R14	
36	041-415	RESISTOR, COMP, 68K, 1/4W, 5%	R11	
37	041-443	RESISTOR, COMP, 39K, 1/4W, 5%	R1	

Sheet 1 of 2

4050692B
Capstan Servo PWA

Next Assy: 4020373

ITEM NO	PART NUMBER	DESCRIPTION	REF. DESIG	QTY. REQ. PER DASH NUMBER
38	041-483	RESISTOR, COMP, 27K, 1/4W, 5%	R35	
39	041-495	RESISTOR, COMP, 8.2K, 1/4W, 5%	R3	
40	041-502	RESISTOR, COMP, 240, 1/4W, 5%	R26	
41	041-503	RESISTOR, COMP, 270, 1/4W, 5%	R6	
42	041-504	RESISTOR, COMP, 510, 1/4W, 5%	R25	
43	041-514	RESISTOR, COMP, 9.1K, 1/4W, 5%	R20	
44	041-530	RESISTOR, COMP, 15, 1/4W, 5%	R29	
45	041-484	RESISTOR, COMP, 15K, 1/4W, 5%	R28	
46	041-534	RESISTOR, COMP, 100K, 1/4W, 5%	R23, 29	
47	041-453	RESISTOR, COMP, 390, 1/4W, 5%	R21	
48	055-133	CAPACITOR, MYLAR, .0022UF, 50V, 5%	C10	
49	055-148	CAPACITOR, MYLAR, .0056UF, 50V, 5%	C12	
50	041-562	RESISTOR, COMP, 43K OHMS, 1/4W, 5%	R28	
51	057-137	RESISTOR, METAL FILM, 51K, 1/4W, 2%	R12, 13, 15, 17, 21	
52	041-487	RESISTOR, 300, 1/4W, 5%	R28	
53	058-754	RESISTOR, VAR, CER MET, 100K, 1W, 20%	R19	
54	143-981	CONNECTOR, JACK	E1-6	
55	150-106	MTC BRACKET, CRYSTAL	REF: Y1	
56	166-628	PLUG, SHORTING BLOCK, ALK		
57				
58	471-062	SCREEN, X REC PAN NO, 4-40 X .375 LG		
59	492-008	MUT, PLAIN, HEX, 4-40		
60	501-008	WASHER, FLAT, #4		
61	502-024	WASHER, LOCK #4		
62				
63				
64	500-332	HEATSINK	REF: Q5	
65	500-395	TRANSISTOR, NPN, 2N5190	Q4, 5	
66				
67				
68	586-153	INTEGRATED CIRCUIT, MC846P	A7	
69	586-268	INTEGRATED CIRCUIT, LOGIC	A4	
70	586-283	INTEGRATED CIRCUIT, 907493N	A1	
71	586-309	INTEGRATED CIRCUIT, U649601	A10	
72	586-425	INTEGRATED CIRCUIT, MC853P	A2, 3	
73	586-698	INTEGRATED CIRCUIT, U649550	A6, 8, 9	
74	587-086	INTEGRATED CIRCUIT, B PIN, LM311N	A5	
75	586-680	INTEGRATED CIRCUIT, SN7413J	A11	

4050692B

Sheet 2 of 2

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER
1	450020-01	PRINTED WIRING BOARD		1
2	525E-01	HANDLE, SNAP ON		1
3				
4	4650495	SCHEMATIC	REF	
5	013-583	DIODE, ZENER, 5.6V, CD32	VR1	1
6	013-599	DIODE, SILICON, GM48	CR1-23	23
7	014-747	TRANSISTOR, NPN, CD38	Q1-1A, 2D, 2I	16
8	030-057	CAPACITOR, CER, 0.1UF, 100V	C2-6, 9, 11	7
9	030-437	CAPACITOR, CER, 0.1UF, 25V, +80-20%	C10, 13, 14, 18, 20, 21	6
10	035-093	CAPACITOR, CYLAR, 0.1UF, 50V, +5%	C8	1
11	037-109	CAPACITOR, TANT, 10UF, 20V	C15, 16	2
12	037-167	CAPACITOR, TANT, 2.2UF, 20V	C19	1
13	037-429	CAPACITOR, TANT, 35UF, 35V	C22, 23	2
14	037-738	CAPACITOR, TANT, 27UF, 20V	C12	1
15	037-746	CAPACITOR, TANT, 47UF, 20V	C17	1
16	037-750	CAPACITOR, TANT, 68UF, 20V	C11	1
17	041-336	RESISTOR, COMP, 4700, 1/2W, 5%	R12, 13	2
18	041-396	RESISTOR, COMP, 2200, 1/4W, 5%	R29, 30	2
19	041-409	RESISTOR, COMP, 15K, 1/4W, 5%	R18, 24-26, 31-34	8
20				
21	041-649	RESISTOR, COMP, 330K, 1/4W, 5%	R21, 35, 40	3
22	041-683	RESISTOR, COMP, 27K, 1/4W, 5%	R9, 41	2
23	041-501	RESISTOR, COMP, 3300, 1/4W, 5%	R17	1
24	041-541	RESISTOR, COMP, 5.1K, 1/4W, 5%	R16	1
25	041-766	RESISTOR, COMP, 560K, 1/4W, 5%	R27, 28	2
26	041-772	RESISTOR, COMP, 1.2 MEG O, 1/4W, 5%	R23	1
27	041-782	RESISTOR, COMP, 3.3 MEG O, 1/4W, 5%	R20	1
28	041-428	RESISTOR, CO-P, 4700, 1/4W, 5%	R10	1
29	035-166	CAPACITOR, MYLAR, .001UF, 50V	C7	1
30				
31	058-602	RESISTOR, VAR, 5K, 1/4W, 20%	R5-8	4
32	058-662	RESISTOR, VAR, 1000, 1/4W, 10%	R1-4	4
33	058-655	RESISTOR, VAR, 1.0 MEG, 1/2W, 20%	R9	1
34				
35	280-998	WTE PAD, TRANSISTOR (TOS)	REF: Q1-1A, 2D, 2I, 23, 24	18
36	300-144	TRANSISTOR, SILICON, PNP, NPN, 1090	Q22, 23	2
37	080-467	TRANSISTOR, SILICON, NPN, NPN, 1100	Q15-18	5

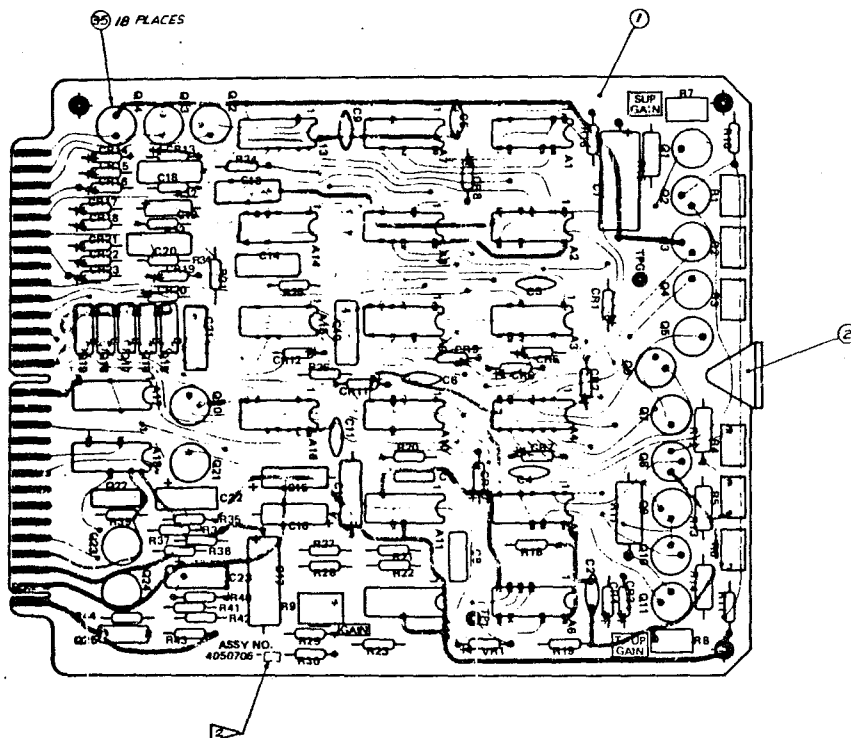
4050706-
Transport Control PWA

Sheet 1 of 3
Next Assy: 4020373

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER
38	586-268	INTEGRATED CIRCUIT, 40741	A11, 12	2
39	587-103	INTEGRATED CIRCUIT, MC680	A4, 5, 13, 16	4
40	587-101	INTEGRATED CIRCUIT, MC661	A2, 9, 14	3
41	587-102	INTEGRATED CIRCUIT, MC668	A1, 2, 6-8, 10, 15, 17	8
42	586-295	INTEGRATED CIRCUIT, MC665	A18	1
43				
44	041-560	RESISTOR, COMP, 2K OHMS, 1/4W, 5%	R11, 38, 53	3
45	041-528	RESISTOR, COMP, 300 OHMS, 1/2W, 5%	R14, 15	2
46	041-408	RESISTOR, COMP, 10K OHMS, 1/4W, 5%	R19, 39, 44	3
47	041-518	RESISTOR, COMP, 33K OHMS, 1/4W, 5%	R22	1
48	041-413	RESISTOR, COMP, 6.8K OHMS, 1/4W, 5%	R37, 42	2
49				
50	014-678	TRANSISTOR, NPN, CD513	S23, 24	2

4050706-

Sheet 2 of 3



NOTES:

- 1. PART NO. IS 4050706-01.
- ▶ MARK DASH NO. PER BDI-1.

4050706—
Transport Control PWA

Sheet 3 of 3

Next Assy: 4020373

ITEM NO	PART NUMBER	DESCRIPTION	REF. DESIG	QTY	RECD PER DASH NUMBER
1	4905918-01	PRINTED WIRING ASSY, MOTOR DRIVE ASSEMBLY	1		
2	4905882-01	CHASSIS, MOTOR DRIVE ASSEMBLY	1		
3	4905883-01	COVER, MDA CHASSIS	1		
4	4905874-01	HEATSINK, POWER TRANSISTOR	5		
5					
6					
7	4905336	SCHEMATIC, MOTOR DRIVE ASSEMBLY	REF		
8					
9					
10	014-614	TRANSISTOR, POWER, MPN ED461	05		
11	036-417	CAPACITOR, 1 UF, 1750 V, 203	CS-7		
12	150-142	TRANSISTOR, MTG KIT	5		
13	147-607	CONNECTOR, MALE CHASSIS MTC, 15 PIN			
14	173-492	TERMINAL, QUICK-DISCONNECT 16-14 AWG, FEMALE			
15	013-556	RESISTOR, W, M, PWR, 1 OHM, 5W, 3% R6-9			
16	260-014	GROMMET	1		
17	471-062	SCREW, MACH, PAN HD, REEC, 4-40 X 3/8 LG	6		
18	471-060	SCREW, MACH, PAN HD, REEC, 4-40 X 1/4 LG	4		
19	471-068	SCREW, MACH, PAN HD, REEC, 6-32 X 5/16 LG	14		
20	471-077	SCREW, MACH, PAN HD, REEC, 8-32 X 5/16 LG	4		
21	471-081	SCREW, MACH, PAN HD, REEC, 8-32 X 5/8 LG	2		
22	496-004	NUT, KEPS, 4-40	6		
23	496-005	NUT, KEPS, 6-32	2		
24	501-008	WASHER, PLAIN #4	4		
25	501-009	WASHER, PLAIN #6	12		
26	501-010	WASHER, PLAIN #8	5		
27	502-002	LOCK WASHER, SPRING #4	4		
28	502-003	LOCK WASHER, SPRING #6	12		
29	502-004	LOCK WASHER, SPRING #8	5		
30					
31	580-533	TRANSISTOR, POWER MPN	03, 4, 6, 7		
32	581-095	DIODE BRIDGE ASSY, CD65-200	CR3, 4		
33	CD568	WIRE, INS, STRANDED, 20 AWG	A/R		
34	CD568	WIRE, INS, STRANDED, 16 AWG	A/R		
35	615-019	WIPE, #18 AW, SOLID, BARE	A/R		

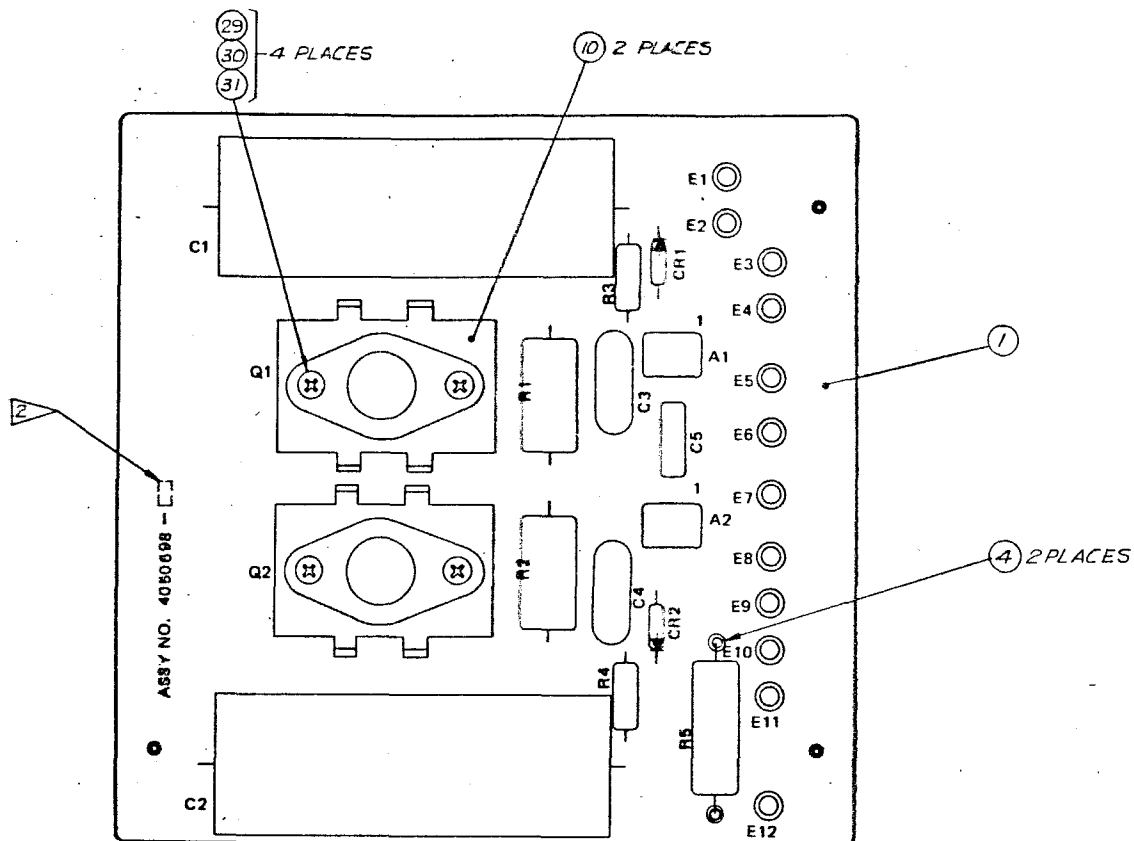
ITEM NO	PART NUMBER	C	DESCRIPTION	REF. DESIG.	QTY. REQD PER DASH NUMBER
1	450215-01		PRINTED WIRING BOARD W/ASSY FROM 573-1124	1	
2	450215-01		SCHEMATIC	REF	
3	101307-01		SPACER	2	
4	013-573		DIODE, SILICON, CRL-2	2	
5	580-219		TRANSISTOR, POWER 2N4240	2	
6	013-573		DIODE, SILICON, CRL-2	2	
7	013-573		DIODE, SILICON, CRL-2	2	
8	013-573		DIODE, SILICON, CRL-2	2	
9	013-573		DIODE, SILICON, CRL-2	2	
10	013-573		DIODE, SILICON, CRL-2	2	
11	013-573		DIODE, SILICON, CRL-2	2	
12	013-573		DIODE, SILICON, CRL-2	2	
13	013-573		DIODE, SILICON, CRL-2	2	
14	013-573		DIODE, SILICON, CRL-2	2	
15	013-573		DIODE, SILICON, CRL-2	2	
16	013-573		DIODE, SILICON, CRL-2	2	
17	013-573		DIODE, SILICON, CRL-2	2	
18	013-573		DIODE, SILICON, CRL-2	2	
19	013-573		DIODE, SILICON, CRL-2	2	
20	013-573		DIODE, SILICON, CRL-2	2	
21	013-573		DIODE, SILICON, CRL-2	2	
22	013-573		DIODE, SILICON, CRL-2	2	
23	013-573		DIODE, SILICON, CRL-2	2	
24	013-573		DIODE, SILICON, CRL-2	2	
25	013-573		DIODE, SILICON, CRL-2	2	
26	013-573		DIODE, SILICON, CRL-2	2	
27	013-573		DIODE, SILICON, CRL-2	2	
28	013-573		DIODE, SILICON, CRL-2	2	
29	013-573		DIODE, SILICON, CRL-2	2	
30	013-573		DIODE, SILICON, CRL-2	2	
31	013-573		DIODE, SILICON, CRL-2	2	

4050698--

Motor Drive Amplifier PWA

Sheet 1 of 2

Next Assy: 4020374



NOTES:

1. PART NO. IS 4050698-D1.

Z MARK DASH NO. PER BDI-1.

4050698—
Motor Drive Amplifier PWA

Sheet 2 of 2

Next Assy: 4020374

ITEM NO	PART NUMBER	DESCRIPTION	UNIT PRICE	QTY REQ PER DASH NUMBER
1	452997-01	PANEL, CAN	1	
2				
3	591-053	FAN ROTATION WHISPER	3	
4				
5	591-207	SQUARE PAN.	3	
6				
7	180-388	STRIP TERM	1	
8				
9			12	
10				
11	471-071	SCREW, PH, 6-32 X .500	4	
12	471-072	SCREW, PH, 6-32 X .625	12	
13				
14				
15	496-005	NUT, KEPS #6	12	
16				
17	501-009	WASHER, FLAT #6	28	
18	492-034	NUT, HEZ 6-32, SMALL PATTERN	4	
19	501-188	WASHER, FLAT #6 SMALL PATTERN	4	
20	502-003	WASHER, LOCK, SPRING #6	4	

4020379-
Fan Assembly

Sheet 1 of 1

Next Assy: 4010210

ITEM NO	PART NUMBER	DESCRIPTION	REF. DISC. NO.	QTY REQD PER DASH NUMBER
1	4150149-C1	FRAME MODIFICATION	1	
2				
3	4290805-01	PANEL, BOTTOM	1	
4	4260595-01	ANGLE MOUNTING, REAR	1	
5	4290808-01	PANEL, CONNECTOR	1	
6	4330321-01	PLATE, FOUR HINGE	2	
7	4120072-01	CATCH	2	
8				
9	4260513-01	BRACKET, DOOR HINGE	1	
10	4260513-02	BRACKET, DOOR HINGE	1	
11	470-016	SCREW, CAP, HEX, SOC, HD, 10-32 X 3/8	6	
12				
13	496-005	NUT, NIPS, 6-32	8	
14	496-007	NUT, NIPS, 10-32	6	
15	496-009	NUT, NIPS, 1/4-20	16	
16				
17	497-190	NUT, SPRING, #10-32	44	
18				
19	501-011	WASHER, #10	6	
20	501-012	WASHER, 1/4-20	32	
21				
22				
23	087-050	CASTER, SWIVEL	4	
24				
25				
26				
27	422-016	BEARING, NYLON	2	
28	480-096	SCREW, TOLT, 1/4-20 X 3/4 LG, HEX, HC	16	
29				
30				
31				
32				
33				
34	280-751	SPACER CONNECTOR, PANEL	2	
35	471-011	SCREW, PAN, HD, FIN, C, 10-32 X 1 1/8	2	
36	494-007	NUT, NIPS	2	
37	501-011	WASHER	4	

Sheet 1 of 1

4020383A

Frame Assembly

Next Assy: 4010210

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER
-01	-02		-01	-02
1	42908A-01	HEATSHK., TRANSISTOR		2
2	405089-01	PWA, 35V REGULATOR		1
3	405089 04	PWA, 15/27V REGULATOR		1
4	43908B-01	CHASSIS, POWER SUPPLY		1
5	43908B-01	TRANSFORMER, POWER		1
6	43908B-01	SCHEMATIC, 35V POWER SUPPLY		REF
7	484039	SCHEMATIC, 15/27V POWER SUPPLY		REF
8	484039	SHIELD, POWER SUPPLY		REF
9	43908B-01	TRANSISTOR, POWER, 2N3773		REF
10	43908A-01	SHIELD, POWER SUPPLY		1
11	014-014	TRANSISTOR, POWER, CP461	QA	1
12	014-015	TRANSISTOR, POWER, 2N3773	Q1,2	2
13	014-033	MTG KIT, TRANSISTOR TO-66		1
14				
15	031-126	CAPACITOR, AL., 250UF, 50V	C3	1
16	031-126	CAPACITOR, AL., 250UF, 50V	C4	1
17	031-111	CAPACITOR, AL., 500 UF, 25V	C3	1
18				
19	047-748	RESISTOR, W.W.25 OHMS, 25W, 3%	R1,2	2
20				
21	063-182	CAPACITOR, AL., 10K UF, 75V	C1	1
22	063-183	CAPACITOR, AL., 1400 UF, 75V	C2	1
23				
24	070-020	FUSE, 5A, SLOW BLOW	F1	1
25	070-054	FUSE, 10A, FAST BLOW	F2	1
26	085-001	FUSE HOLDER		2
27				
28	143-307	CONNECTOR, PC REEP, 18 CONTACTS	J5	1
29	146-018	CONNECTOR, REET REEP, 10 SOC	J4	1
30	147-029	CONNECTOR, TRYST-LOCK, PAR, 3 MALE CONTACTS	J2	1
31				
32	150-142	MTG KIT, TRANSISTOR TO-3		2
33				
34				
35	171-044	TERMINAL LUG, CRIMP, RING TONGUE #6		4
36	172-003	TERMINAL LUG, SOLDER #10		8
37	173-002	TERMINAL, QUICK DISCONNECT		4

4050658B

Power Supply Assembly

Next Assy: 4010210

Sheet 1 of 2

ITEM NO	PART NUMBER	DESCRIPTION	REF DESIG	QTY REQD PER DASH NUMBER
-01	-02		-01	-02
38	260-039	GRONMET, 3/8 ID		2
39	260-052	GRONMET, CATERPILLAR	A/R/A/R	2
40				
41	302-062	CLAMP, CRABLE, U-SHAPE, 1.662 ID NYLON		1
42	302-067	CLAMP, CRABLE, NYLON		1
43				
44	470-045	SCREW, CAP HEX SOC HD, 1/4-20 X 1/2 LG		4
45	471-061	SCREW, PAN HD 4-40 X 5/16 LG		10
46	471-062	SCREW, PAN HD 4-40 X 3/8 LG		4
47	471-064	SCREW, PAN HD, 5-50 X 1/2 LG		2
48	471-067	SCREW, PAN HD 6-32 X 1/4 LG		2
49	471-068	SCREW, PAN HD 6-32 X 5/16 LG		2
50	471-073	SCREW, PAN HD 6-32 X 5/8 LG		1
51	471-334	SCREW, FLAT HD, 16-32 X 1/4 LG		2
52	996-004	NUT, GEPS, 4-40		12
53				
54	501-008	WASHER, FLAT #4		8
55	501-009	WASHER, FLAT #6		13
56	502-002	WASHER, LOCK, SPLIT #4		2
57	502-003	WASHER, LOCK, SPLIT #6		15
58				
59	580-127	TRANSISTOR, POWER, 2N3057	Q3	1
60	581-251	DIODE ASSY, POWER	CR1	1
61	616-415	CABLE, SHIELDED, TWISTED PAIR	A/R	
62				
63	617-263	WIRE, INS, 30 AWG, 50M	A/R/A/R	
64	617-267	WIRE, INS, 20 AWG, VIO	A/R/A/R	
65	617-269	WIRE, INS, 12 AWG, BLK	A/R/A/R	
66	618-268	WIRE, INS, 14 AWG, RED	A/R/A/R	
67	618-269	WIRE, INS, 18 AWG, GRN	A/R/A/R	
68				
69	611-276	WIRE, INS, 16 AWG, BLU	A/R/A/R	
70	611-278	WIRE, INS, 16 AWG, VIO	A/R/A/R	
71	613-272	WIRE, INS, 16 AWG, RED	A/R/A/R	
72	613-273	WIRE, INS, 16 AWG, BLK	A/R/A/R	
73	611-276	WIRE, INS, 16 AWG, GRN	A/R/A/R	
74	4290922-01	ENCLOSURE, TRANSFORMER		1
75	4290923-01	COVER, TRANSFORMER		1

4050658B

Sheet 2 of 2

ITEM NO	PART NUMBER	DESCRIPTION	REV. DATE	QTY REQD PER DASH NUMBER	
				42-03	04
1	550011-01	PRINTING WIRING BOARD			
2	5502121-01	COIL, BLK, 5K			
3	550716-02	PRINTED WIRING BOARD			
4	550911	SCHEMATIC, 35V	REF		
5	550911R	SCHEMATIC, 15/27V	REF		
6					
7	5522-01	HANDLE, 500G, 10"			
8	121302-01	STANDOFF			
9	013-599	DIODE, 10A58			
10	013-578	DIODE, 10A57			
11	013-578	DIODE, 10A51			
12	013-747	DIODE, ZENER, 13V, 2W			
13	013-729	DIODE, ZENER, 43V, 1W, 1M4755			
14	013-911	DIODE, ZENER, 33V, 1W, 1M4752			
15	013-370	DIODE, ZENER, 6.8V, 1W, 1M4736			
16	013-197	DIODE, ZENER, 8.2V, 1W, 1M4738			
17	013-202	DIODE, ZENER, 9.1V, 1W, 1M4739			
18	013-203	DIODE, ZENER, 18V, 1W, 1M4745			
19					
20					
21	013-723	TRANSISTOR, PNP, 2N4037			
22	014-247	TRANSISTOR, NPN, CD38			
23	014-555	HEATING, TRANSISTOR, T0-5			
24	014-590	TRANSISTOR, NPN, 2N4053			
25	014-590	TRANSISTOR, NPN, 2N4053			
26	014-653	TRANSISTOR, NPN, CD325			
27					
28	580-504	TRIPISTOR, SCR, 2N4042			
29					
30	010-057	CAPACITOR, CEP, .01UF, 50V, 20%			
31	010-057	CAPACITOR, CEP, .01UF, 50V, 20%			
32	055-191	CAPACITOR, CEP, 0.1UF, 50V, 10%			
33					
34	010-207	CAPACITOR, MICA, 500PF, 300V, 5%			
35	010-204	CAPACITOR, MICA, 2500PF, 500V, 5%			
36	037-728	CAPACITOR, TANT, 6.8UF, 6V, 10%			
37	317-361	CAPACITOR, TANT, 330UF, 6V, 10%			

Sheet 1 of 3

4050699A
Regulator-Oscillator PWA

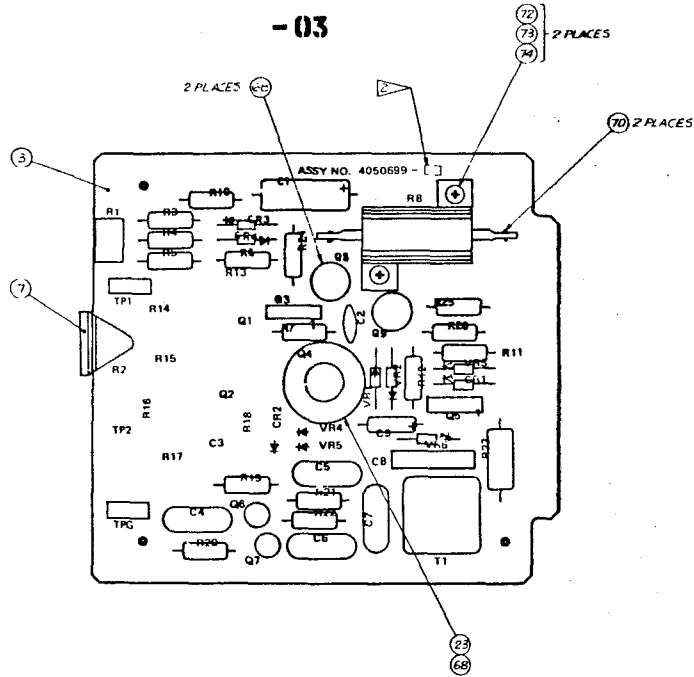
Next Assy: 4050658

ITEM NO	PART NUMBER	DESCRIPTION	REV. DATE	QTY REQD PER DASH NUMBER	
				42-03	04
38	041-003	RESISTOR, COMP, 1000, 1/2W, 5%			
39	041-008	RESISTOR, COMP, 1.5K, 1/2W, 5%			
40	041-008	RESISTOR, COMP, 1.5K, 1/2W, 5%			
41	041-010	RESISTOR, COMP, 2K, 1/2W, 5%			
42	041-016	RESISTOR, COMP, 22K, 1/2W, 5%			
43	041-135	RESISTOR, COMP, 390, 1W, 10%			
44	041-147	RESISTOR, COMP, 1.2K, 1W, 10%			
45	041-158	RESISTOR, COMP, 10K, 1W, 10%			
46	041-277	RESISTOR, COMP, 820, 1/2W, 5%			
47	041-317	RESISTOR, COMP, 820 OHMS, 1/2W, 5%			
48	041-553	RESISTOR, COMP, 240, 1/2W, 5%			
49	041-553	RESISTOR, COMP, 240, 1/2W, 5%			
50	041-586	RESISTOR, COMP, 3300, 2W, 5%			
51	041-245	RESISTOR, COMP, 1K, 1/2W, 5%			
52	047-216	RESISTOR, WIREWOUND, 10, 2W, 10%			
53	047-480	RESISTOR, WIREWOUND, 10, 25W, 5%			
54					
55					
56	056-108	CAPACITOR, MICA, 800PF, 500V, 5%			
57					
58	058-569	RESISTOR, CERMET, VAR, 200, 1W, 10%			
59	058-569	RESISTOR, CERMET, VAR, 200, 1W, 10%			
60					
61	059-170	RESISTOR, CERMET, VAR, 200, 1W, 10%			
62					
63					
64	148-057	CONNECTOR, PC TIP JACK, GRN			
65	148-058	CONNECTOR, PC TIP JACK, RED			
66	148-059	CONNECTOR, PC TIP JACK, BLK			
67					
68	280-388	MTC PAD, TRANSISTOR, T0-5			
69					
70	815-024	WIRE, BAWE, SOLID, #18			
71					
72	471-061	SCREEN, XREC P/W, NO. 4-60 X 5/16 LG			
73	496-004	NUT, REFS, 4-40			
74	501-008	WASHER, FLAT, #4			
75					
76	041-014	RESISTOR, COMP, 10K OHMS, 1/2W, 5%			
77	041-283	RESISTOR, COMP, 47 OHMS, 1/2W, 5%			
78	041-329	RESISTOR, COMP, 330 OHMS, 1/2W, 5%			
79	041-245	RESISTOR, COMP, 1K OHMS, 1/2W, 5%			
80					
81					
82					
83					
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Sheet 2 of 3

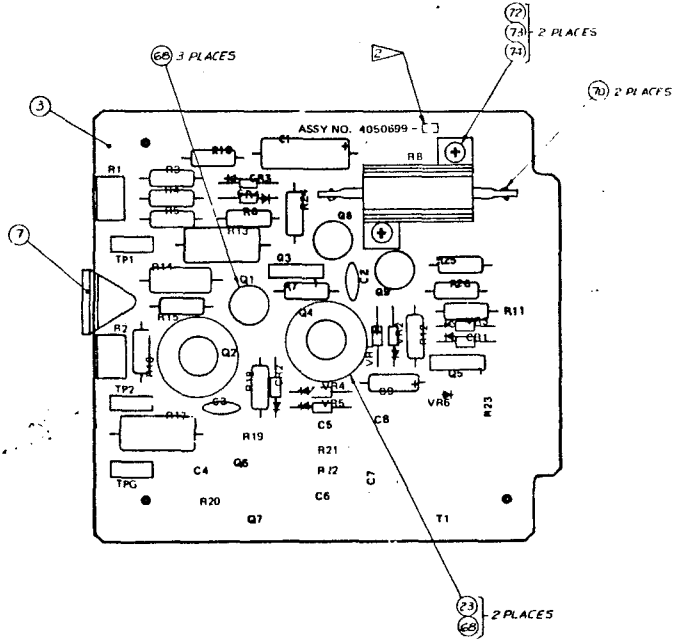
4050699A

-03



NOTES:
1. PART NO. IS 4050689-XX.
▶ MARK DASH NO. PER BDI-1.

-04



4050699A
Regulator-Oscillator PWA

Sheet 3 of 3

Next Assy: 4050658

ITEM NO	PART NUMBER	DESCRIPTION	QTY REQ PER DASH NUMBER			
			01	02	03	04
1	N10284-01	OVERLAY, CONTROL PANEL, 8 CHANNEL	1	-	-	-
2	N10284-02	OVERLAY, CONTROL PANEL, 16 CHANNEL	-	1	-	-
3	N10284-03	OVERLAY, CONTROL PANEL, 24 CHANNEL	-	-	1	-
4	N920821-01	SUBPANEL, CONTROL BOX	1	1	1	1
5	N10284-04	BASE, CONTROL BOX	1	1	1	1
6	N10284-05	OVERLAY, CONTROL PANEL	-	-	1	-
7	N20082-01	BUTTON, "LITZER DEFECT"	1	1	1	1
8	N20082-02	BUTTON, "RECORD", RED	1	1	1	1
9	N20082-03	BUTTON, "PLAY", GREEN	1	1	1	1
10	N20082-04	BUTTON, "STOP", YELLOW	1	1	1	1
11	N20082-05	BUTTON, "REWIND"	1	1	1	1
12	N20082-06	BUTTON, "FAST FORWARD"	1	1	1	1
13	N20082-07	SWITCH, ROCKER, SAFE / READY, MO. 1	1	1	1	1
14	N20082-08	SWITCH, ROCKER, SAFE / READY, MO. 2	1	1	1	1
15	N20082-09	SWITCH, ROCKER, SAFE / READY, MO. 3	1	1	1	1
16	N20082-10	SWITCH, ROCKER, SAFE / READY, MO. 4	1	1	1	1
17	N20082-11	SWITCH, ROCKER, SAFE / READY, MO. 5	1	1	1	1
18	N20082-12	SWITCH, ROCKER, SAFE / READY, MO. 6	1	1	1	1
19	N20082-13	SWITCH, ROCKER, SAFE / READY, MO. 7	1	1	1	1
20	N20082-14	SWITCH, ROCKER, SAFE / READY, MO. 8	1	1	1	1
21	N20082-15	SWITCH, ROCKER, SAFE / READY, MO. 9	-	1	1	-
22	N20082-16	SWITCH, ROCKER, SAFE / READY, MO. 10	-	1	1	-
23	N20082-17	SWITCH, ROCKER, SAFE / READY, MO. 11	-	1	1	-
24	N20082-18	SWITCH, ROCKER, SAFE / READY, MO. 12	-	1	1	-
25	N20082-19	SWITCH, ROCKER, SAFE / READY, MO. 13	-	1	1	-
26	N20082-20	SWITCH, ROCKER, SAFE / READY, MO. 14	-	1	1	-
27	N20082-21	SWITCH, ROCKER, SAFE / READY, MO. 15	-	1	1	-
28	N20082-22	SWITCH, ROCKER, SAFE / READY, MO. 16	-	1	1	-
29	N20082-23	SWITCH, ROCKER, SAFE / READY, MO. 17	-	1	1	-
30	N20082-24	SWITCH, ROCKER, SAFE / READY, MO. 18	-	1	1	-
31	N20082-25	SWITCH, ROCKER, SAFE / READY, MO. 19	-	1	1	-
32	N20082-26	SWITCH, ROCKER, SAFE / READY, MO. 20	-	1	1	-
33	N20082-27	SWITCH, ROCKER, SAFE / READY, MO. 21	-	1	1	-
34	N20082-28	SWITCH, ROCKER, SAFE / READY, MO. 22	-	1	1	-
35	N20082-29	SWITCH, PCKER, SAFE / READY, MO. 23	-	1	1	-
36	N20082-30	SWITCH, ROCKER, SAFE / READY, MO. 24	-	1	1	-
37						

Sheet 1 of 2

4050646A
Control Box, 8, 16, and 24-Channel

Next Assy: 4010210

ITEM NO	PART NUMBER	DESCRIPTION	QTY REQ PER DASH NUMBER			
			01	02	03	04
38	M20083-01	SWITCH, ROCKER, MONITOR NORMAL/INPUT, YEL-GRN	1	1	1	-
39	M20083-02	SWITCH, ROCKER, "REPRO-SEL SYNC", TEL-GRN	1	1	1	-
40	M20083-03	SWITCH, ROCKER, "SPEED 30-15", GRN-RED	1	1	1	-
41	4840347	SCHEMATIC, CONTROL BOX	REF	REF	REF	REF
42	013-678	DIODE, SILICON, SMALL SIGNAL	8	16	24	-
43	060-373	LAMP, INCANDESCENT, 28V	5	5	5	5
44	060-471	LAMP, INCANDESCENT, 28V	22	38	54	-
45	119-188	SWITCH, PUSHBUTTON, MOMENTARY	6	6	6	6
46						
47	141-057	CONNECTOR, 104 PINS	JT	1	1	1
48	615-012	WIRE, SOLID, UNINSULATED, 20 AWG	A/R	A/R	A/R	A/R
49	600-234	SLEEVEING, TEFLON, FLEXIBLE, 20 AWG	A/R	A/R	A/R	A/R
50	173-041	TERMINAL STUD, #6-32 EXT THREAD	4	4	4	4
51	169-143	CONTACTS, CONN. PIN	45	69	93	8
52	250-165	BUMPER, RUBBER	4	4	4	4
53	280-716	SPACER, THREADED, 1/4-40 X 2.35 LG	4	4	4	4
54	280-163	SPACER, PLAIN #6-32 X 1" LG	4	4	4	4
55	470-018	SCREW, CAP, HEX SOC, 6-32 X .375	4	4	4	4
56	471-061	SCREW, MACH, PAN HD, 1/4-40 X 5/16 LG	16	16	16	16
57	471-064	SCREW, MACH, PAN HD, 1/4-40 X 1/2 LG	4	4	4	4
58						
59	495-006	NUT, SELF-LOCKING, 6-32	4	4	4	4
60	496-004	NUT, KEPS 4-40	5	5	5	5
61						
62	501-008	WASHER, FLAT #4	20	20	20	20
63	502-024	WASHER, LOCK, INT TOOTH #4	12	12	12	12
64						
65	310-740	CARTON ASSY	2	2	2	2
66	C0568	WIRE, STRANDED, INSULATED, 22 AWG	A/R	A/R	A/R	A/R
67	815-006	WIRE, #14 AWG SOLID, BARE	A/R	A/R	A/R	A/R
68						
69						
70	M20083-01	HARNES ASSY, CONTROL BOX	1			
71	M20083-02	HARNES ASSY, CONTROL BOX	1			
72	M20083-03	HARNES ASSY, CONTROL BOX	1			
73	M20083-04	HARNES ASSY, CONTROL BOX	1			

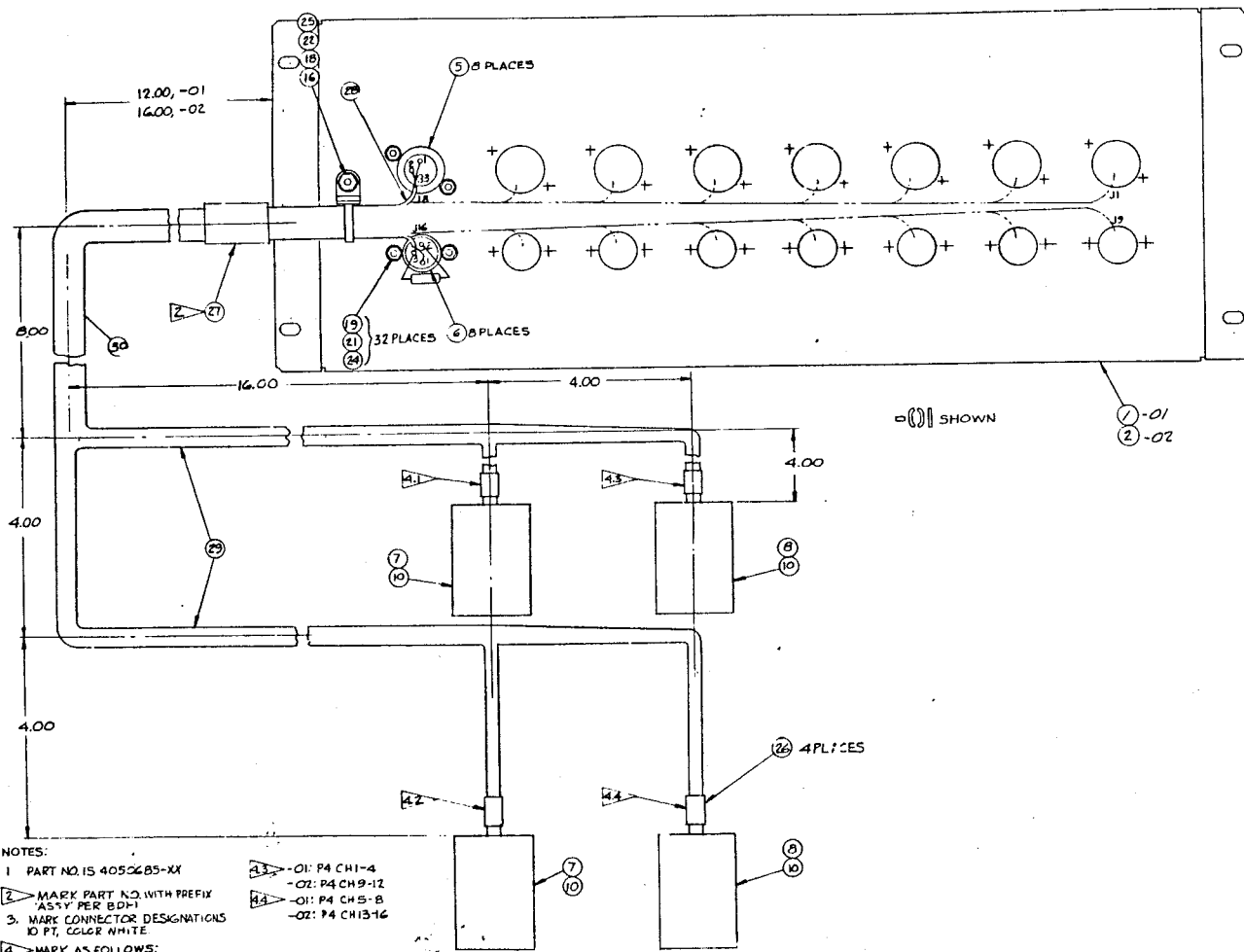
4050646A

Sheet 2 of 2

ITEM NO	PART NUMBER	DESCRIPTION	REF DISG	QTY	REC'D	PRE	DAS	NUMBER
1	486047-02	ANGLE, CONTROL BOX		1				
2	486048-01	ANGLE, CONTROL BOX		1				
3	486019-01	BRACKET, AC OUTPUT		1				
4	486020-01	BRACKET, CIRCUIT BREAKER		1				
5	486021-01	COVER, TERMINAL BLOCK		1				
6	486022-01	SCHEMATIC, CIRCUIT BREAKER		1				
7	486023-01	SCHEMATIC, CIRCUIT BREAKER		1				
8	486024-01	SCHEMATIC, CIRCUIT BREAKER		1				
9	486025-01	SCHEMATIC, CIRCUIT BREAKER		1				
10	486026-01	TERMINAL STRIP, 8 DUAL TERMINALS		1				
11	486027-01	TRIP-MANUAL		1				
12	486028-01	TRIP-MANUAL		1				
13	486029-01	TERMINAL LUG, CRIMP, BRG TORQUE		14				
14	486030-01	TERMINAL LUG, CRIMP, BRG TORQUE		14				
15	486031-01	CONN., NEP, AC, PWR, 250V/100A		1				
16	486032-01	CONNECTOR, NEP, AC, PWR		1				
17	486033-01	CONN., NEP, AC, PWR		1				
18	486034-01	CONN., NEP, AC, PWR		1				
19	486035-01	CONN., NEP, AC, PWR		1				
20	486036-01	CONN., NEP, AC, PWR		1				
21	486037-01	CONN., NEP, AC, PWR		1				
22	486038-01	CONN., NEP, AC, PWR		1				
23	486039-01	CONN., NEP, AC, PWR		1				
24	486040-01	CONN., NEP, AC, PWR		1				
25	486041-01	CONN., NEP, AC, PWR		1				
26	486042-01	CONN., NEP, AC, PWR		1				
27	486043-01	CONN., NEP, AC, PWR		1				
28	486044-01	CONN., NEP, AC, PWR		1				
29	486045-01	CONN., NEP, AC, PWR		1				
30	486046-01	CONN., NEP, AC, PWR		1				
31	486047-01	CONN., NEP, AC, PWR		1				
32	486048-01	CONN., NEP, AC, PWR		1				
33	486049-01	CONN., NEP, AC, PWR		1				
34	486050-01	CONN., NEP, AC, PWR		1				
35	486051-01	CONN., NEP, AC, PWR		1				
36	486052-01	CONN., NEP, AC, PWR		1				
37	486053-01	CONN., NEP, AC, PWR		1				
38	486054-01	CONN., NEP, AC, PWR		1				
39	486055-01	CONN., NEP, AC, PWR		1				
40	486056-01	CONN., NEP, AC, PWR		1				
41	486057-01	CONN., NEP, AC, PWR		1				
42	486058-01	CONN., NEP, AC, PWR		1				
43	486059-01	CONN., NEP, AC, PWR		1				
44	486060-01	CONN., NEP, AC, PWR		1				
45	486061-01	CONN., NEP, AC, PWR		1				
46	486062-01	CONN., NEP, AC, PWR		1				
47	486063-01	CONN., NEP, AC, PWR		1				
48	486064-01	CONN., NEP, AC, PWR		1				
49	486065-01	CONN., NEP, AC, PWR		1				
50	486066-01	CONN., NEP, AC, PWR		1				
51	486067-01	CONN., NEP, AC, PWR		1				
52	486068-01	CONN., NEP, AC, PWR		1				
53	486069-01	CONN., NEP, AC, PWR		1				
54	486070-01	CONN., NEP, AC, PWR		1				
55	486071-01	CONN., NEP, AC, PWR		1				
56	486072-01	CONN., NEP, AC, PWR		1				
57	486073-01	CONN., NEP, AC, PWR		1				
58	486074-01	CONN., NEP, AC, PWR		1				
59	486075-01	CONN., NEP, AC, PWR		1				
60	486076-01	CONN., NEP, AC, PWR		1				
61	486077-01	CONN., NEP, AC, PWR		1				
62	486078-01	CONN., NEP, AC, PWR		1				
63	486079-01	CONN., NEP, AC, PWR		1				
64	486080-01	CONN., NEP, AC, PWR		1				
65	486081-01	CONN., NEP, AC, PWR		1				
66	486082-01	CONN., NEP, AC, PWR		1				
67	486083-01	CONN., NEP, AC, PWR		1				
68	486084-01	CONN., NEP, AC, PWR		1				
69	486085-01	CONN., NEP, AC, PWR		1				
70	486086-01	CONN., NEP, AC, PWR		1				
71	486087-01	CONN., NEP, AC, PWR		1				
72	486088-01	CONN., NEP, AC, PWR		1				
73	486089-01	CONN., NEP, AC, PWR		1				
74	486090-01	CONN., NEP, AC, PWR		1				
75	486091-01	CONN., NEP, AC, PWR		1				
76	486092-01	CONN., NEP, AC, PWR		1				
77	486093-01	CONN., NEP, AC, PWR		1				
78	486094-01	CONN., NEP, AC, PWR		1				
79	486095-01	CONN., NEP, AC, PWR		1				
80	486096-01	CONN., NEP, AC, PWR		1				
81	486097-01	CONN., NEP, AC, PWR		1				
82	486098-01	CONN., NEP, AC, PWR		1				
83	486099-01	CONN., NEP, AC, PWR		1				
84	486100-01	CONN., NEP, AC, PWR		1				
85	486101-01	CONN., NEP, AC, PWR		1				
86	486102-01	CONN., NEP, AC, PWR		1				
87	486103-01	CONN., NEP, AC, PWR		1				
88	486104-01	CONN., NEP, AC, PWR		1				
89	486105-01	CONN., NEP, AC, PWR		1				
90	486106-01	CONN., NEP, AC, PWR		1				
91	486107-01	CONN., NEP, AC, PWR		1				
92	486108-01	CONN., NEP, AC, PWR		1				
93	486109-01	CONN., NEP, AC, PWR		1				
94	486110-01	CONN., NEP, AC, PWR		1				
95	486111-01	CONN., NEP, AC, PWR		1				
96	486112-01	CONN., NEP, AC, PWR		1				
97	486113-01	CONN., NEP, AC, PWR		1				
98	486114-01	CONN., NEP, AC, PWR		1				
99	486115-01	CONN., NEP, AC, PWR		1				
100	486116-01	CONN., NEP, AC, PWR		1				

Sheet 1 of 1

4050647A
 Circuit Breaker Assembly
 Next Assy: 4010210



4050685—
Input/Output Connector Panel (8 and 16-Channel)

Sheet 2 of 2

Next Assy: 4010210

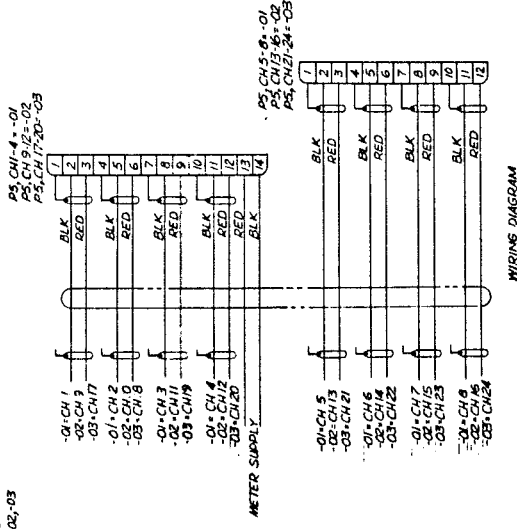
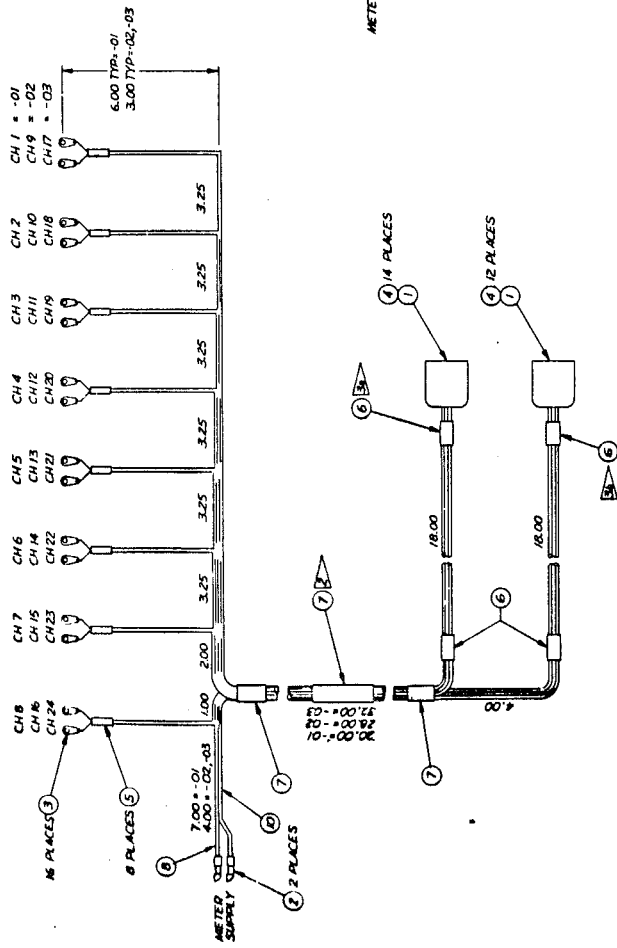
ITEM NO.	PART NUMBER	DESCRIPTION	REF. DESIG.					QTY. REQ. PER DIS. NUMBER								
			-01	-02	-03	-04	-05	-01	-02	-03	-04	-05				
1	405082-01	HARNES ASBY, METER PANEL			1											
2	405083-02	HARNES ASBY, METER PANEL				1										
3	4110287-01	OVERLAY, METER PANEL					1									
4	4110287-02	OVERLAY, METER PANEL						1								
5	4110289-01	OVERLAY, METER PANEL							1							
6	4150350-01	ARM REST ASSY								1						
7	442007-01	BLDCK, METER PANEL									1					
8	442013-01	BRACKET, METER PANEL										1				
9	442013-02	BRACKET, METER PANEL											1			
10	442014-01	METER PANEL												1		
11	442014-02	METER PANEL													1	
12	060-251	LAMP, 28 VOLT									16	12				
13	087-227	BRACKET, MULTIPLE											1/2 A/A	A/A	A/A	A/A
14	442014-03	HARNES ASBY, METER PANEL														
15	140-048	SOCKET, LAMP									16	12				
16	222-252	TAPE, ADHESIVE SINGLE LINED, COP											A/A	A/A	A/A	A/A
17	431-242	BEARING, .252 ID X .48 OD X .08 THK											8	8	8	8
18	171-054	SCREW, #4-32 X .37 LG. PAN HD STLS														
19	482-008	MUT. PLAIN 44-50									24	10	56	8	12	
20	482-011	MUT. PLAIN #10-32														
21	4110287-03	OVERLAY, METER PANEL														
22	4110289-02	OVERLAY, METER PANEL														
23	501-008	WASHER, PLAIN #4									8	8	16	8	12	
24	501-009	WASHER, PLAIN #6									8	8	8	8	8	8
25	501-227	WASHER, BOWED .355 I.D. X .006 THK														
26	171-059	SCREW, #4-32 X .37 LG. PAN HD STLS														
27	502-002	WASHER, LOCK #4									8	8	8	8	8	8
28	502-003	WASHER, LOCK #6									8	8	8	8	8	8
29	501-017	WASHER, INT LOCK #10														
30	492-008	MUT. PLAIN #4-32														
31	02959	WIM. THERMAL PURPOSE HOOP-UP 28 AMT											A/A	A/A	A/A	A/A
32	280-719	SPACER, HEX 3/16 AF #4-40 X .50 LG									16	12				
33	280-718	SPACER, THREADED #4-40 X .31 LG									8	8	16	8	12	
34	4840344	WIRING DIA. 1MM, METER PANEL											10P	14P	16P	
35	090-078	WASHER, MODUTIC #10-32											8	16	24	
36	474-038	SCREW, SHOULDER #10-32														
37	501-212	WASHER, .355 I.D. X .41 O.D. X .08 THK														

Sheet 1 of 1

4050707-

Meter Panel Assembly

Next Assy: 4010210

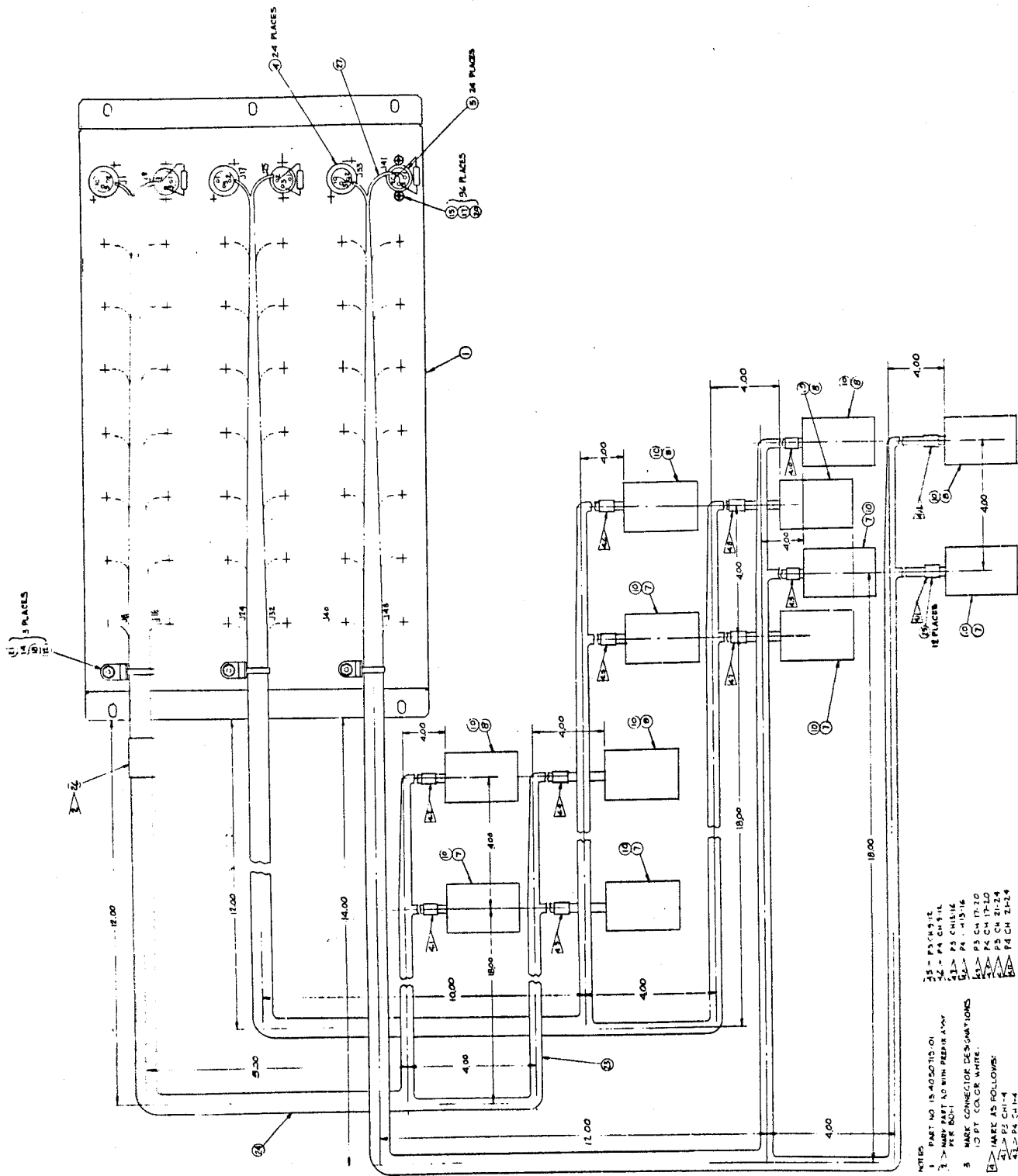


WIRING DIAGRAM

1/2	1/2	10	617-050	WIRE, 20 AWG, RED
1/2	1/2	9	616-253	CABLE, SHIELDED & JACKETED, 2 COND, 22 AWG
1/2	1/2	8	611-256	WIRE, 20 AWG, BLACK
1/2	1/2	7	600-257	CLEAVING, SHANKABLE, .500 I.D.
1/2	1/2	6	670-254	CLEAVING, SHANKABLE, .375 I.D.
1/2	1/2	5	622-253	CLEAVING, SHANKABLE, .125 I.D.
26	26	4	107-036	TERMINAL BLOCK DISCONNECT, PALE
16	16	3	171-005	TERMINAL LOG SOLDER, 20 GA, 10/10
2	2	2	171-009	TERMINAL LOG SOLDER, WHITE PASTE
2	2	1	166-054	CONNECTOR PART, 20 GA, 27 AWG, 15 CONTACTS
1	1	1		TERMINAL BLOCK
1	1	1		WIRE

NOTES:
 1. PART NO. IS 4050682-YX
 2. MARK PART NO. PER BDI-1
 3. MARK DEF DES PER BDI-1
 4. 01, MARK 'PS, CH 14', 02, MARK 'PS, CH 9-12', 03, MARK 'PS, CH 17-20', 04, MARK 'PS, CH 13-16', 05, MARK 'PS, CH 18-21', 06, MARK 'PS, CH 22-24'

ITEM NO	PART NUMBER	DESCRIPTION	REF. DESC. QTY	QTY REQ'D PER DASH NUMBER
1	4290914-01	PANEL CONNECTOR, 24 CHANNEL	1	
2				
3				
4	146-998	CONNECTOR, AUDIO RECEPT, 3 SOC	24	
5	146-999	CONNECTOR, AUDIO RECEPT, 3 PIN	24	
6				
7	165-144	CONNECTOR, RECT. RECEPT, 12 SOC	6	
8	165-866	CONNECTOR, RECT. RECEPT, 12 SOC	6	
9				
10	187-937	TERMINAL, QUICK-DISCONNECT, FEMALE	144	
11	041-006	RESISTOR, COMP. 620 OHMS, 1/2W, 5%	24	
12	302-365	STAMP, CABLE	3	
13				
14	671-069	SCREW, MACH. PAN HD. X REC. 6-32 X .375	3	
15	471-918	SCREW, MACH. FLAT HD. X REC. 4-40 X .375	96	
16				
17	493-004	NUT, KEPS, 4-40	96	
18	498-005	NUT, KEPS, 6-32	3	
19				
20	501-008	WASHER, FLAT, #4	96	
21	501-009	WASHER, FLAT, #6	3	
22				
23	600-057	TUBING, FLEXIBLE, BLK., 500 ID	A/R	
24	600-279	TUBING, FLEXIBLE, BLK., 875 ID	A/R	
25	600-256	TUBING, HEAT SHRINKABLE, BLK., 375 ID	A/R	
26	600-258	TUBING, HEAT SHRINKABLE, BLK., 1.00 ID	A/R	
27	616-208	CABLE, SHIELDED, TWISTED PAIR, 2 COND, 22 AWG	A/R	



4050715—
Input/Output Connector Panel (24-Channel)

Sheet 2 of 2

Next Assy: 4010210

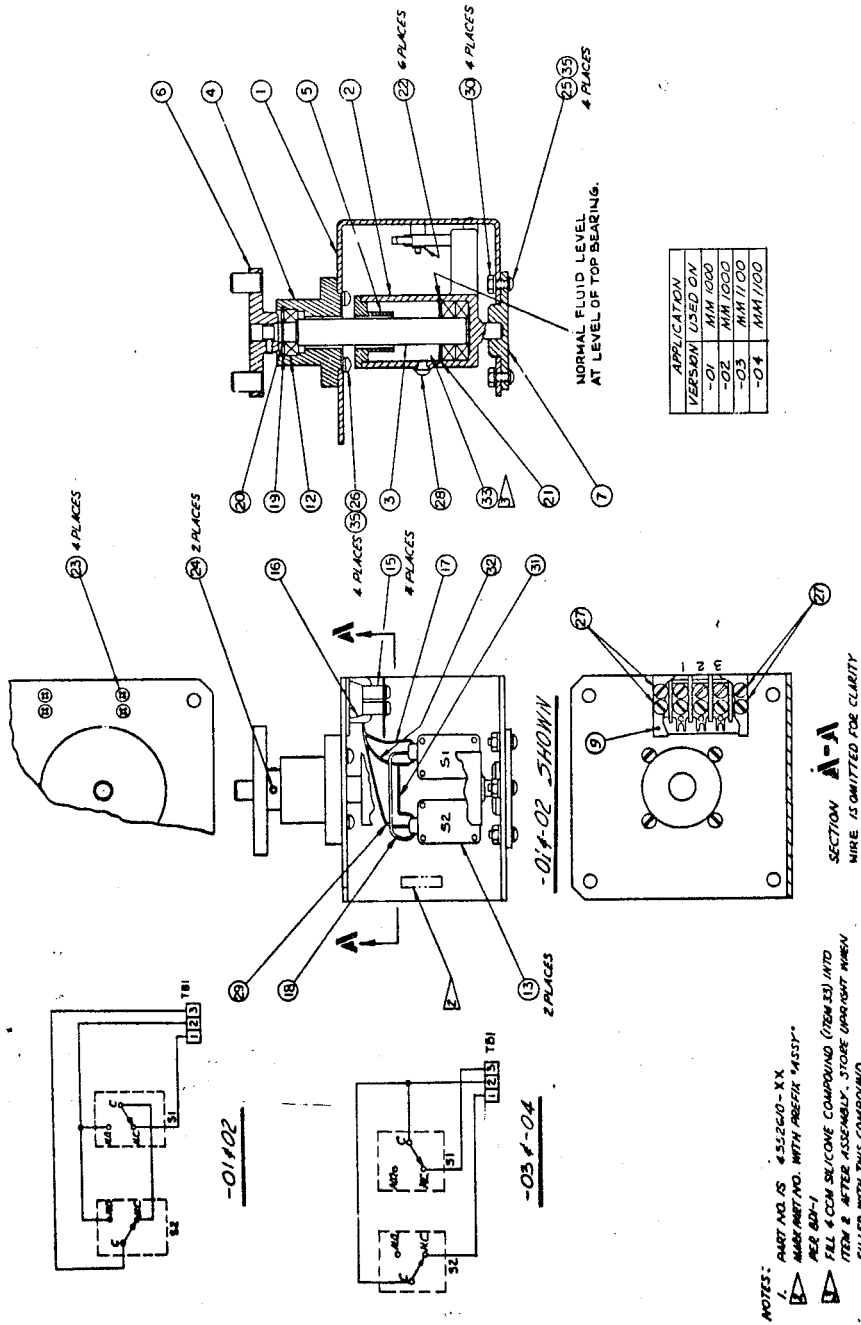
- NOTES
- 1 PART NO IS 4050715-01
 - 2 MARK PART NO WITH PERMANENT MARKER
 - 3 MARK CONNECTOR DESIGNATIONS
 - 4 MARK IS FOLLOWS:
 - 5 24 CH 1-4
 - 6 24 CH 5-8
 - 7 24 CH 9-12
 - 8 24 CH 13-16
 - 9 24 CH 17-20
 - 10 24 CH 21-24
 - 11 24 CH 25-28
 - 12 24 CH 29-32
 - 13 24 CH 33-36
 - 14 24 CH 37-40
 - 15 24 CH 41-44
 - 16 24 CH 45-48
 - 17 24 CH 49-52
 - 18 24 CH 53-56
 - 19 24 CH 57-60
 - 20 24 CH 61-64
 - 21 24 CH 65-68
 - 22 24 CH 69-72
 - 23 24 CH 73-76
 - 24 24 CH 77-80
 - 25 24 CH 81-84
 - 26 24 CH 85-88
 - 27 24 CH 89-92
 - 28 24 CH 93-96
 - 29 24 CH 97-100
 - 30 24 CH 101-104
 - 31 24 CH 105-108
 - 32 24 CH 109-112
 - 33 24 CH 113-116
 - 34 24 CH 117-120
 - 35 24 CH 121-124
 - 36 24 CH 125-128
 - 37 24 CH 129-132
 - 38 24 CH 133-136
 - 39 24 CH 137-140
 - 40 24 CH 141-144
 - 41 24 CH 145-148
 - 42 24 CH 149-152
 - 43 24 CH 153-156
 - 44 24 CH 157-160
 - 45 24 CH 161-164
 - 46 24 CH 165-168
 - 47 24 CH 169-172
 - 48 24 CH 173-176
 - 49 24 CH 177-180
 - 50 24 CH 181-184
 - 51 24 CH 185-188
 - 52 24 CH 189-192
 - 53 24 CH 193-196
 - 54 24 CH 197-200
 - 55 24 CH 201-204
 - 56 24 CH 205-208
 - 57 24 CH 209-212
 - 58 24 CH 213-216
 - 59 24 CH 217-220
 - 60 24 CH 221-224
 - 61 24 CH 225-228
 - 62 24 CH 229-232
 - 63 24 CH 233-236
 - 64 24 CH 237-240
 - 65 24 CH 241-244
 - 66 24 CH 245-248
 - 67 24 CH 249-252
 - 68 24 CH 253-256
 - 69 24 CH 257-260
 - 70 24 CH 261-264
 - 71 24 CH 265-268
 - 72 24 CH 269-272
 - 73 24 CH 273-276
 - 74 24 CH 277-280
 - 75 24 CH 281-284
 - 76 24 CH 285-288
 - 77 24 CH 289-292
 - 78 24 CH 293-296
 - 79 24 CH 297-300
 - 80 24 CH 301-304
 - 81 24 CH 305-308
 - 82 24 CH 309-312
 - 83 24 CH 313-316
 - 84 24 CH 317-320
 - 85 24 CH 321-324
 - 86 24 CH 325-328
 - 87 24 CH 329-332
 - 88 24 CH 333-336
 - 89 24 CH 337-340
 - 90 24 CH 341-344
 - 91 24 CH 345-348
 - 92 24 CH 349-352
 - 93 24 CH 353-356
 - 94 24 CH 357-360
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 - 96 24 CH 365-368
 - 97 24 CH 369-372
 - 98 24 CH 373-376
 - 99 24 CH 377-380
 - 100 24 CH 381-384
 - 101 24 CH 385-388
 - 102 24 CH 389-392
 - 103 24 CH 393-396
 - 104 24 CH 397-400
 - 105 24 CH 401-404
 - 106 24 CH 405-408
 - 107 24 CH 409-412
 - 108 24 CH 413-416
 - 109 24 CH 417-420
 - 110 24 CH 421-424
 - 111 24 CH 425-428
 - 112 24 CH 429-432
 - 113 24 CH 433-436
 - 114 24 CH 437-440
 - 115 24 CH 441-444
 - 116 24 CH 445-448
 - 117 24 CH 449-452
 - 118 24 CH 453-456
 - 119 24 CH 457-460
 - 120 24 CH 461-464
 - 121 24 CH 465-468
 - 122 24 CH 469-472
 - 123 24 CH 473-476
 - 124 24 CH 477-480
 - 125 24 CH 481-484
 - 126 24 CH 485-488
 - 127 24 CH 489-492
 - 128 24 CH 493-496
 - 129 24 CH 497-500
 - 130 24 CH 501-504
 - 131 24 CH 505-508
 - 132 24 CH 509-512
 - 133 24 CH 513-516
 - 134 24 CH 517-520
 - 135 24 CH 521-524
 - 136 24 CH 525-528
 - 137 24 CH 529-532
 - 138 24 CH 533-536
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 - 158 24 CH 613-616
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 - 161 24 CH 625-628
 - 162 24 CH 629-632
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 - 182 24 CH 709-712
 - 183 24 CH 713-716
 - 184 24 CH 717-720
 - 185 24 CH 721-724
 - 186 24 CH 725-728
 - 187 24 CH 729-732
 - 188 24 CH 733-736
 - 189 24 CH 737-740
 - 190 24 CH 741-744
 - 191 24 CH 745-748
 - 192 24 CH 749-752
 - 193 24 CH 753-756
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 - 195 24 CH 761-764
 - 196 24 CH 765-768
 - 197 24 CH 769-772
 - 198 24 CH 773-776
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 - 216 24 CH 845-848
 - 217 24 CH 849-852
 - 218 24 CH 853-856
 - 219 24 CH 857-860
 - 220 24 CH 861-864
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 - 223 24 CH 873-876
 - 224 24 CH 877-880
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 - 229 24 CH 897-900
 - 230 24 CH 901-904
 - 231 24 CH 905-908
 - 232 24 CH 909-912
 - 233 24 CH 913-916
 - 234 24 CH 917-920
 - 235 24 CH 921-924
 - 236 24 CH 925-928
 - 237 24 CH 929-932
 - 238 24 CH 933-936
 - 239 24 CH 937-940
 - 240 24 CH 941-944
 - 241 24 CH 945-948
 - 242 24 CH 949-952
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 - 248 24 CH 973-976
 - 249 24 CH 977-980
 - 250 24 CH 981-984
 - 251 24 CH 985-988
 - 252 24 CH 989-992
 - 253 24 CH 993-996
 - 254 24 CH 997-1000

ITEM NO.	PART NUMBER INC SIZ	DESCRIPTION	REF DESC	QTY REQD PER DSH NUMBER			
				01	02	03	04
1	210922-10B	BRACKET-MOTION SWITCH		1	1	1	
2	210943-10B	HOUSING-ACTUATOR		1	1	1	
3	210945-10E	SHAFT-BEARING S/A		1	1	1	
4	210946-10B	HOUSING-BEARING		1	1	1	
5	210947-10B	CAP-HOUSING		1	1	1	
6	210950-10B	COUPLING-PIN S/A		1	1	1	
7	210951-10C	COLLAR		1	1	1	
8							
9	211065-10B	COVER-TERMINAL BLOCK		1	1	1	
10							
11							
12	140044-93	BEARING BALL		1	1	1	
13	210607	SWITCH	S1,2	2	2	2	
14	200-229	SWITCH					
15	280-016	SPACER, 1/4 DIA X 3/8 X #6-32 THD		4	4	4	
16	180-422	TERMINAL BLOCK, 3 TERM (KULOR 800 2/45T-3)		1	1	1	
17	619-993	WIRE, STRD, 1MS, 22 AWG, WIR 5' LG		1	1	1	
18	619-993	WIRE, STRD, 1MS, 22 AWG, WIR 4 1/2 LG		1	1	1	
19	430-085	RETAINING RING		1	1	1	
20	430-086	RETAINING RING		1	1	1	
21	330-063	RETAINING RING		1	1	1	
22	430-902	RETAINING RING		6	6	6	
23	471-338	SCREW, FLAT HD, #6-32 X 1/2 LG		4	4	4	
24	472-184	SCREW, SET, #6-32 X 3/16, NYLON		2	2	2	
25	471-071	SCREW, PAN HD, #6-32 X 1/2 LG		4	4	4	
26	475-059	SCREW, SEM, #6-32 X 1/2 LG		4	4	4	
27	475-013	SCREW, SEM, #6-32 X 3/16 LG		4	4	4	
28	470-185	SCREW, CAP, R-32, NYLON		1	1	1	
29	419-982	WIRE, STRD, 1MS, 22 AWG, GT 3' LG		1	1	1	
30	496-002	NUT, KEP #6-32		4	4	4	
31	619-985	WIRE, STRD, 1MS, 22 AWG, WIR 2 1/2 LG		1	1	1	
32	619-985	WIRE, STRD, 1MS, 22 AWG, WIR 4' LG		1	1	1	
33	087-434	SILICONE COMPOUND 50,000 CS		1	1	1	
34	087-720	TUBE OF SILICONE COMPOUNT 50,000		1	1	1	
35	801-009	MASHER, FLAT #6		8	8	8	
36	800233	INSTALLATION INSTRUCTIONS		1	1	1	
37	619-787	WIRE, STRANDED, 1MS, 22 AWG, 54' LG		1	1	1	

4952610D
Motion Sense Assembly

Sheet 1 of 2

Next Assy: 4010210



SIMILAR TO 1210952

Sheet 2 of 2

4952610D
Motion Sense Assembly

Next Assy: 4010210

NOTES:
 1. PART NO. IS 4552610-XX
 2. MAKE PART NO. WITH PREFIX "ASST"
 PER 820-1
 3. FILL & COM. SILICONE COMPOUND (158433) AND
 ITEM 2 AFTER ASSEMBLY. STORE UPRIGHT WHEN
 FILLED WITH THIS COMPOUND.

SCHEMATIC DIAGRAMS

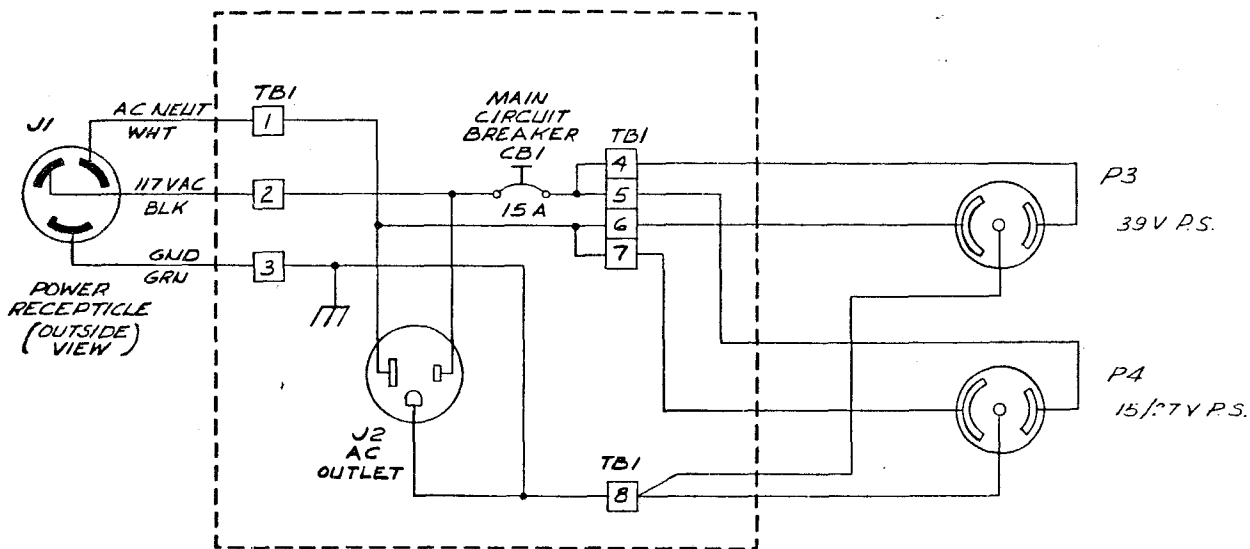
DRAWING NO.	TITLE	PAGE
4840343—	Circuit Breaker Assembly	137
4840299—	39 V Power Supply, -01	139
4840337A	39 V Regulator PWA, -01	141
4840342—	15/27 V Power Supply, -02	143
4840339A	15/27 V Regulator PWA, -02	145
4840346A	Transport Harness	147
4840348—	Transport Control Wiring Diagram, -01	149
4840349—	Transport Control Wiring Diagram, -02	151
4840345A	Transport Control PWA	153
4840356—	Capstan Servo PWA	155
4840336—	Motor Drive Amplifier	157
4840347—	Control Box	159
4840327—	Electronics Interconnect Diagram	161
4840344—	Audio Switching PWA	163
4840357A	Reproduce, Record, and Bias PWA's	165
4840366—	Meter Panel	167

NUMERICAL INDEX TO SCHEMATIC DIAGRAMS

DRAWING NO.	TITLE	PAGE
4840299—	39 V Power Supply, -01	139
4840327—	Electronics Interconnect Diagram	161
4840336—	Motor Drive Amplifier	157
4840337A	39 V Regulator PWA, -01	141
4840339A	15/27 V Regulator PWA, -02	145
4840342--	15/27 V Power Supply, -02	143
4840343—	Circuit Breaker Assembly	137
4840344—	Audio Switching PWA	163
4840345A	Transport Control PWA	153

NUMERICAL INDEX TO SCHEMATIC DIAGRAMS (Continued)

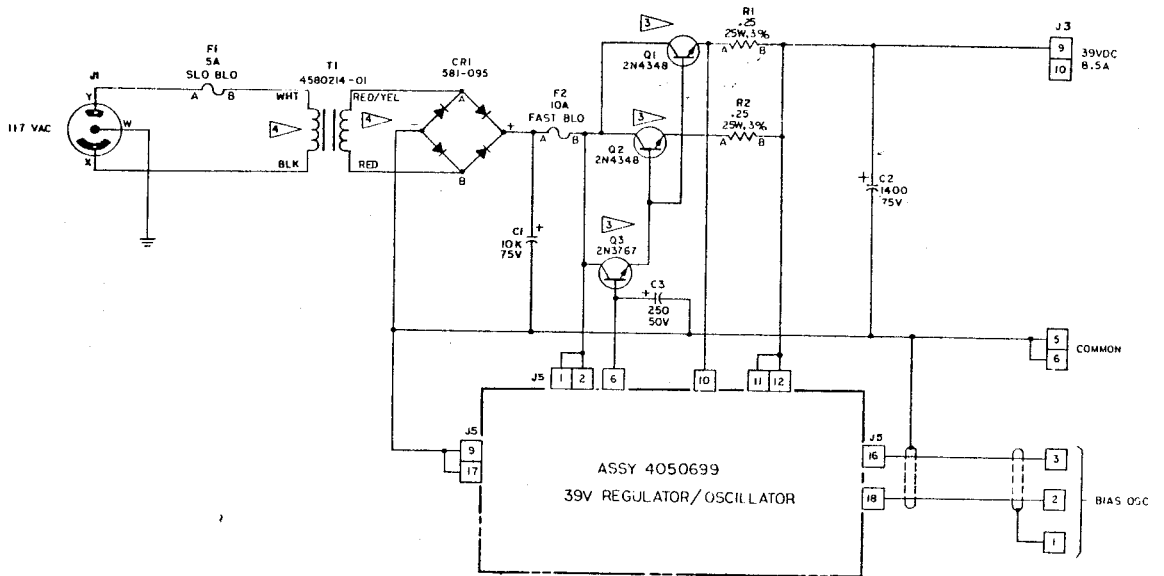
DRAWING NO.	TITLE	PAGE
4840346A	Transport Harness	147
4840347-	Control Box	159
4840348-	Transport Control Wiring Diagram, -01	149
4840349-	Transport Control Wiring Diagram, -02	151
4840356-	Capstan Servo PWA	155
4840357A	Reproduce, Record, and Erase PWA's	165
4840366-	Meter Panel	167



4840343—
Circuit Breaker Assembly

Sheet 1 of 1

Ref. Assy: 4050647



NOTES: UNLESS OTHERWISE SPECIFIED

1. CAPACITANCE VALUES ARE IN MICROFARADS.

2. RESISTANCE VALUES ARE IN OHMS.

⚠ THIS TRANSISTOR TO HAVE HEAT SINK.

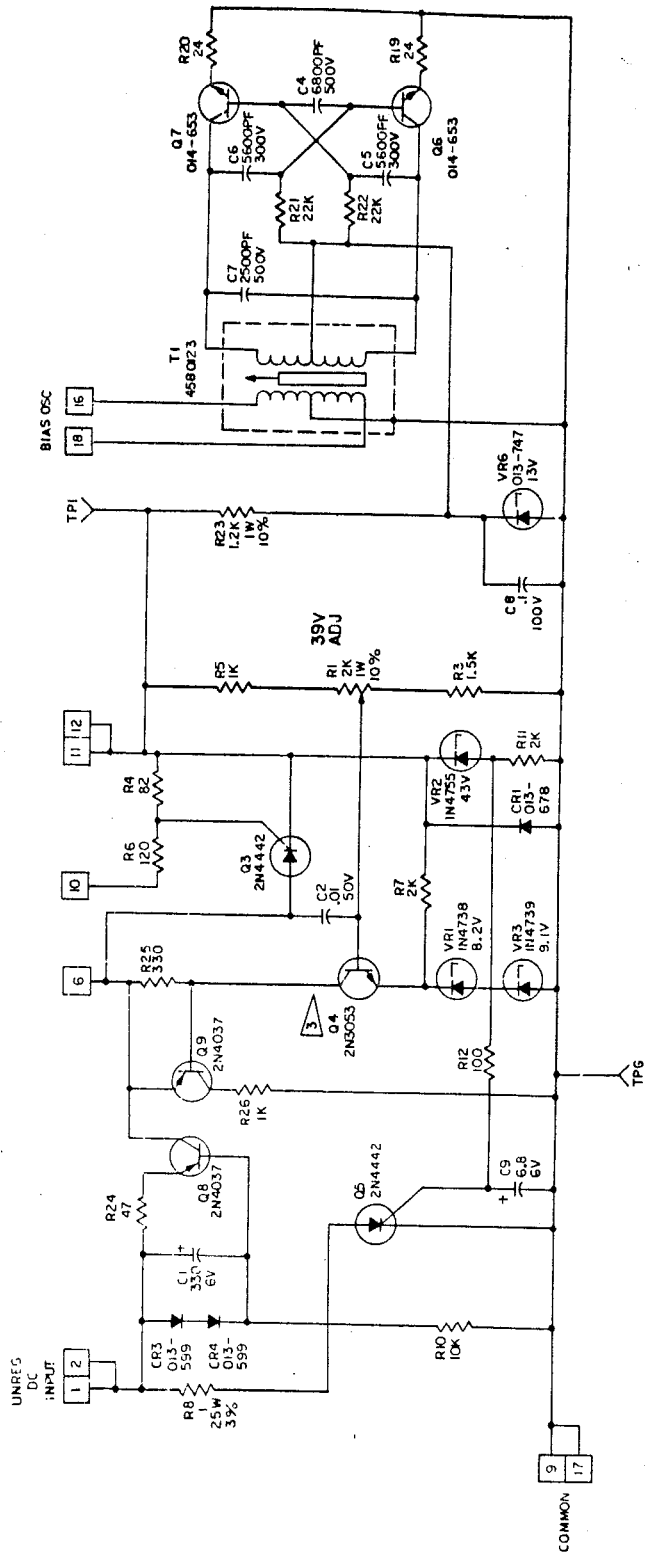
⚡ PRIMARY AND SECONDARY TRANSFORMER LEADS TO BE TWISTED TOGETHER TIGHTLY.

REFERENCE DESIGNATIONS	
LAST USED	NOT USED
C3	
CR1	
F2	
J3	
Q3	
R2	
T1	

4840299-
39 V Power Supply, -01

Sheet 1 of 1

Ref. Assy: 4050658



NOTES: UNLESS OTHERWISE SPECIFIED
 1. CAPACITANCE VALUES ARE IN MICROFARADS.
 2. RESISTANCE VALUES ARE IN OHMS, 1/2W, 5%.
 3. THIS TRANSISTOR TO HAVE HEAT SINK.

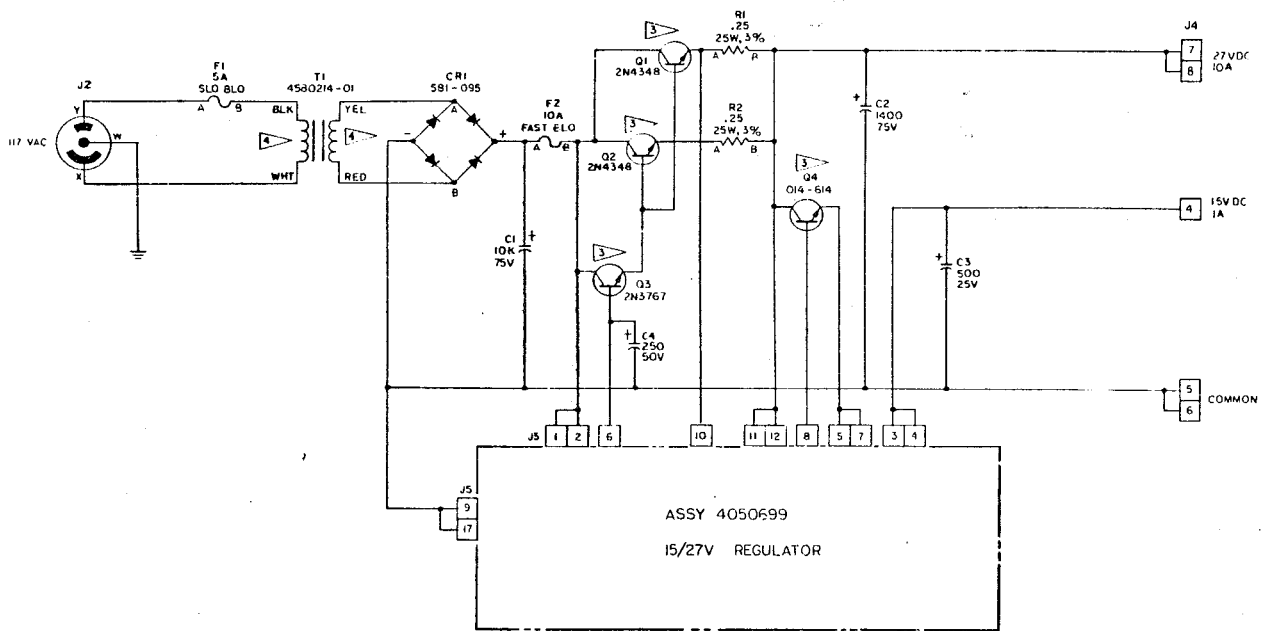
REFERENCE DESIGNATIONS	
LAST USED	NOT USED
C9	C3
CR4	CR2
Q9	Q1, 2
R26	R2, 9, 13-18
VR6	VR4, 5
TP1	TP6

FIELD SERVICE COMPONENT SUBSTITUTION LIST	
AMPEX P/N	NEAREST COMMERCIAL EQUIVALENT
014-653	2N3904

4840337A
 39 V Regulator, -01

Sheet 1 of 1

Ref. Assy: 4050699



NOTES UNLESS OTHERWISE SPECIFIED

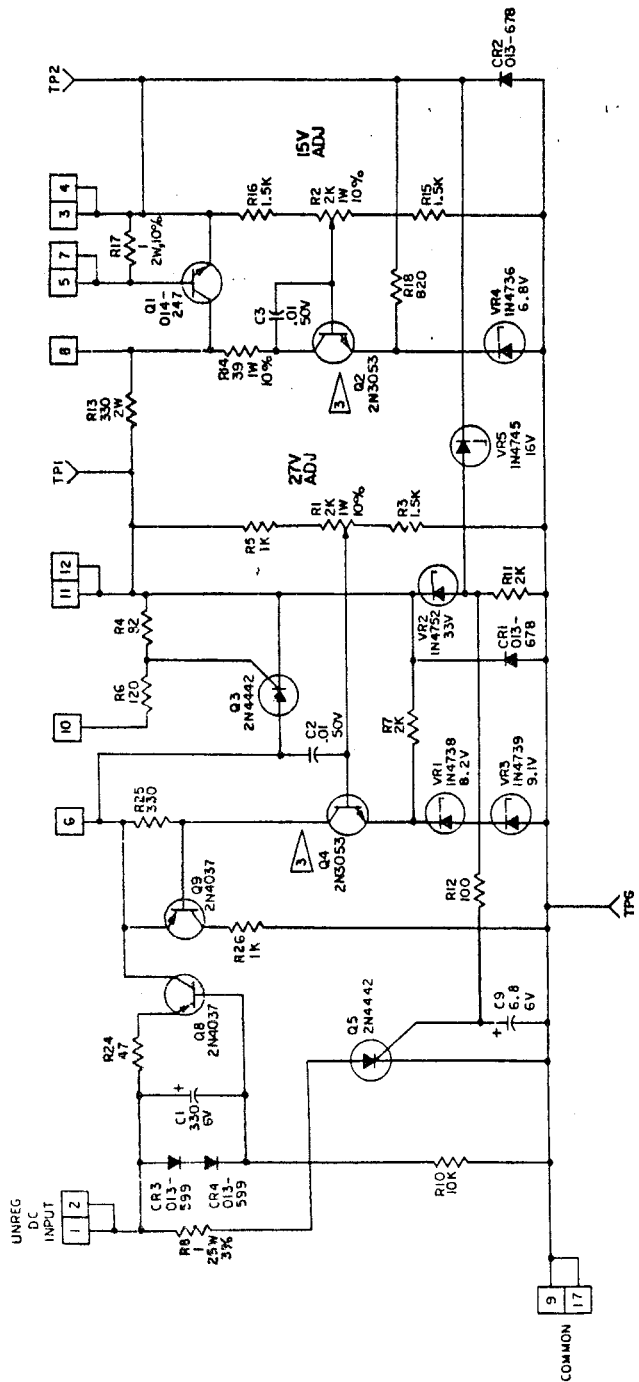
1. CAPACITANCE VALUES ARE IN MICROFARADS.
2. RESISTANCE VALUES ARE IN OHMS.
- 3 THIS TRANSISTOR TO HAVE HEAT SINK.
- 4 PRIMARY AND SECONDARY TRANSFORMER LEADS TO BE TWISTED TOGETHER TIGHTLY.

REFERENCE DESIGNATIONS	
LAST USED	NOT USED
C4	
CR1	
F2	
J5	
Q4	
R2	
T1	

4840342-
15/27 V Power Supply, -02

Sheet 1 of 1

Ref. Assy: 4050658



FIELD SERVICE COMPONENT SUBSTITUTION LIST		
AMPEX P/N	NEAREST COMMERCIAL EQUIVALENT	
O14 - 247	2N2219	

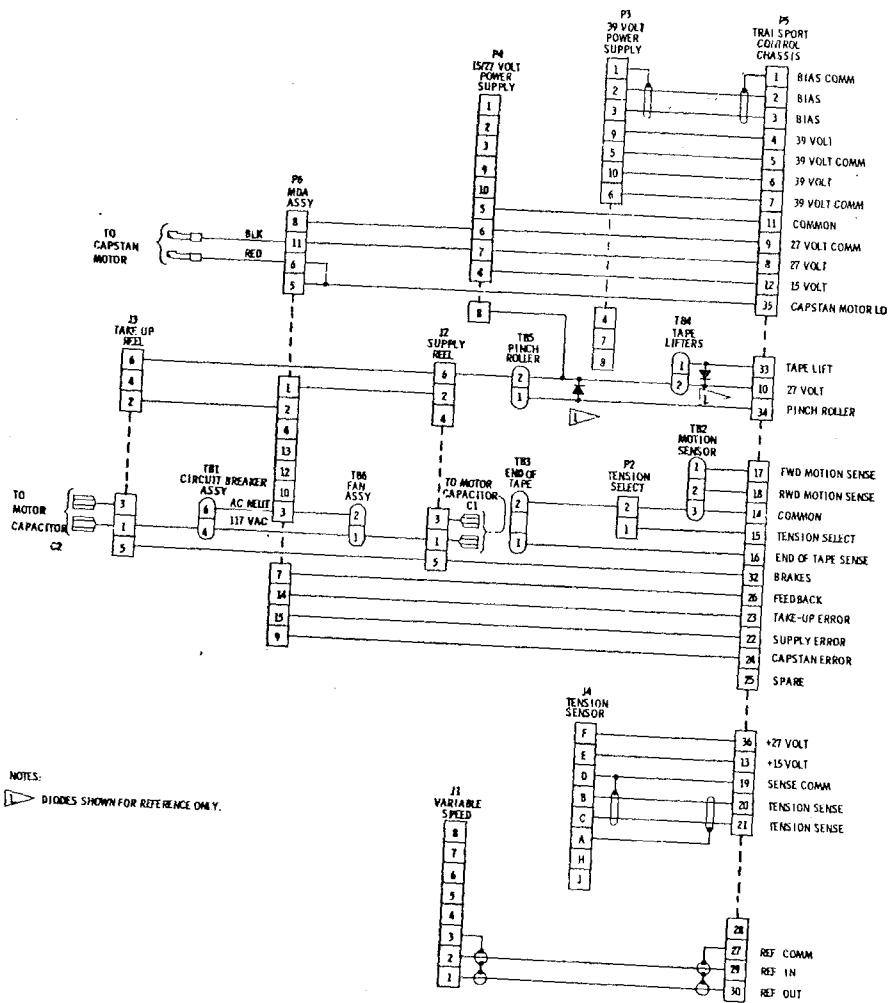
REFERENCE DESIGNATIONS	
LAST USED	NOT USED
C9	C4 THRU C8
CR4	
Q9	Q6,7
R26	R9,19 - 23
VRS	
TP2	TP5

NOTES: UNLESS OTHERWISE SPECIFIED
 1. CAPACITANCE VALUES ARE IN MICRORADARDS.
 2. RESISTANCE VALUES ARE IN OHMS, 1/2%, 5%.
 3. THIS TRANSISTOR TO HAVE HEAT SINK.

Sheet 1 of 1

4840339A
 15/27 V Regulator, -02

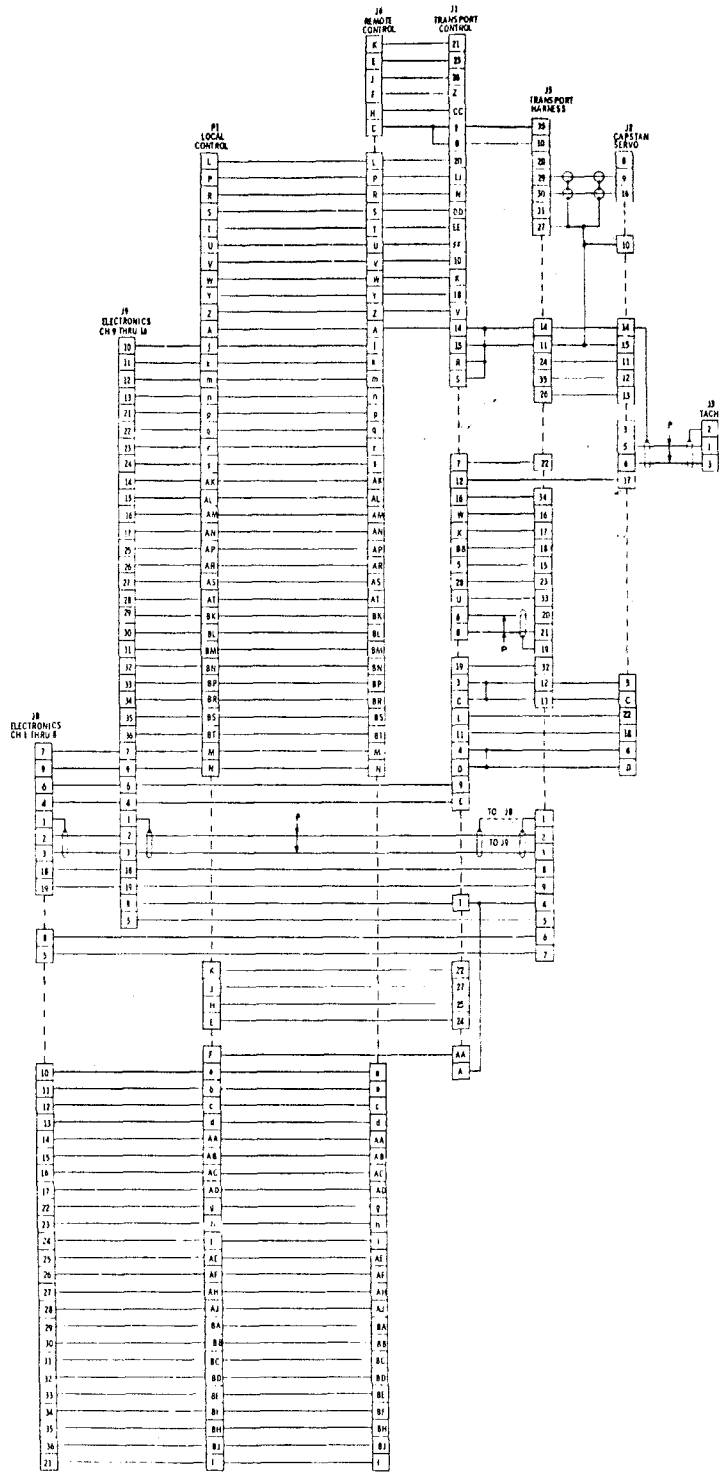
Ref. Assy: 4050699



4840346 A
 Transport Harness

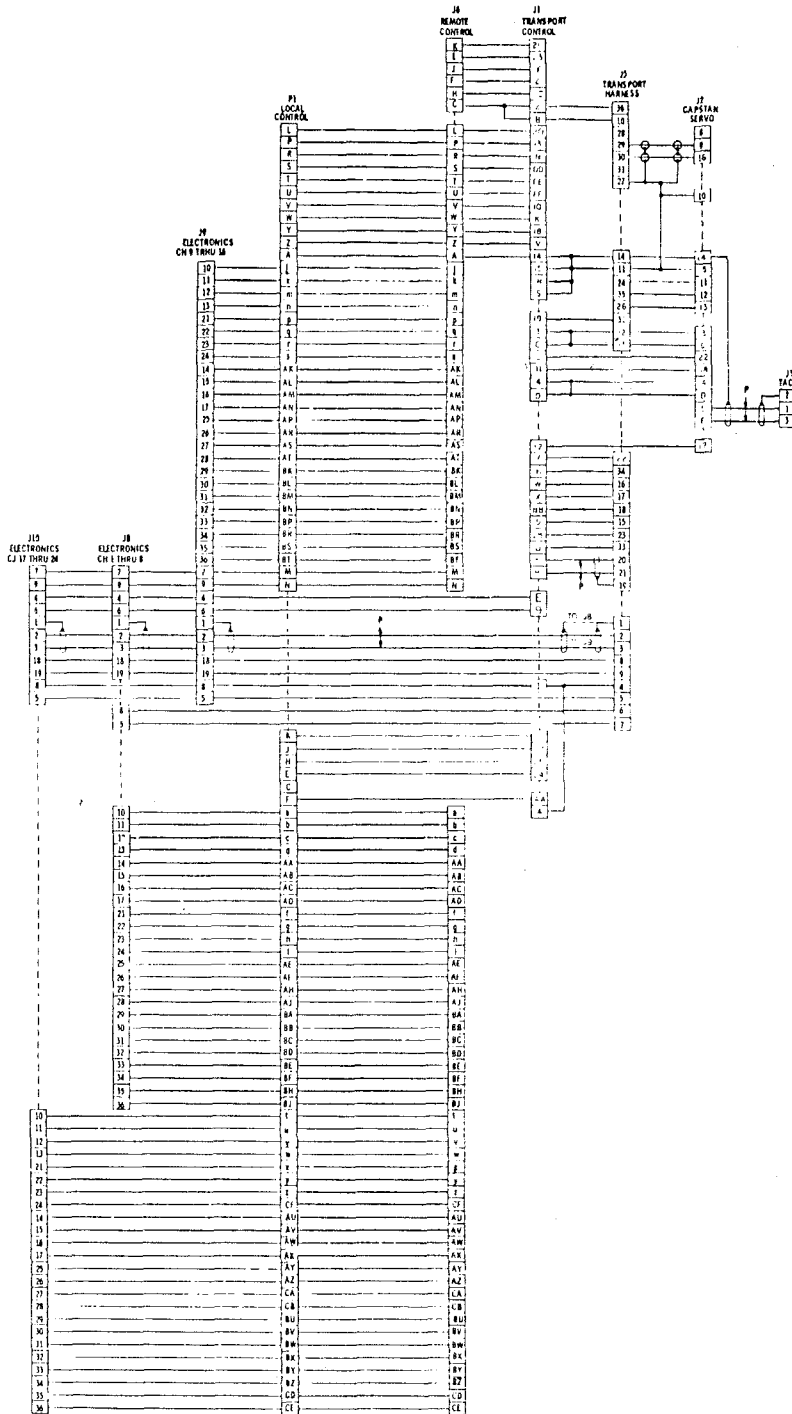
Sheet 1 of 1

Ref. Assy: 4020360



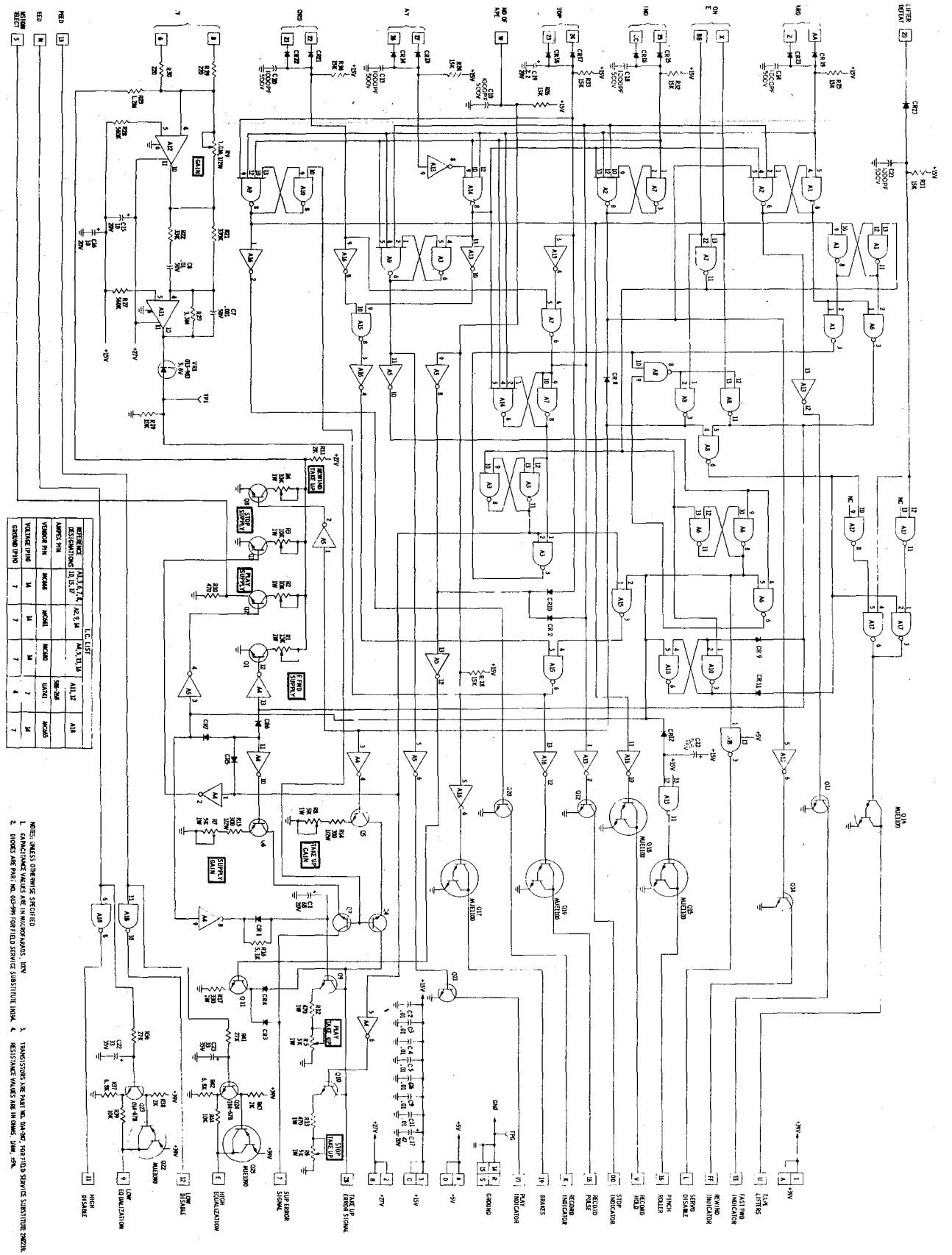
NOTES
 1. THIS DIAGRAM IS FOR THE ELECTRICAL CONTROLS ONLY. DOES NOT
 INCLUDE MECHANICAL PARTS AND TRANSMISSION CONNECTIONS.

4840348-
 Transport Control Wiring Diagram, -01
 Ref. Assy: 4020373



NOTES
 1. THIS DIAGRAM DEMONSTRATES ELECTRICAL CONTINUITY AND DOES NOT NECESSARILY REPRESENT POINT-TO-POINT CONNECTIONS.

4840349—
 Transport Control Wiring Diagram, -02
 Ref. Assy: 4020373



DESIGNATION	IC LIST	IC LIST	IC LIST	IC LIST
AND 2 IN	7400	7401	7402	7403
AND 3 IN	7410	7411	7412	7413
OR 2 IN	7404	7405	7406	7407
OR 3 IN	7414	7415	7416	7417
NAND 2 IN	7400	7401	7402	7403
NAND 3 IN	7410	7411	7412	7413
NOR 2 IN	7404	7405	7406	7407
NOR 3 IN	7414	7415	7416	7417
D FLIP FLOP	7474	7475	7476	7477
MONITOR	7418	7419	7420	7421

NOTE: THESE COMPONENTS ARE AVAILABLE IN THE FOLLOWING PARTS LIST:
 1. TRANSDUCERS, INC. PART NO. 04297 100 TPO SERVICE SUBSTITUTION 2020A
 2. SICKS AND PART NO. 02796 100 TPO SERVICE SUBSTITUTION 2020A
 3. RESISTANCE VALUES ARE IN OHMS, 100K, 1M, 50K

REFERENCE DESIGNATION	IC LIST	IC LIST
AND 2 IN	7400	7401
AND 3 IN	7410	7411
OR 2 IN	7404	7405
OR 3 IN	7414	7415
NAND 2 IN	7400	7401
NAND 3 IN	7410	7411
NOR 2 IN	7404	7405
NOR 3 IN	7414	7415
D FLIP FLOP	7474	7475
MONITOR	7418	7419

Schematic No. 4840345
 Transport Control PWA
 Assy No. 4050706E

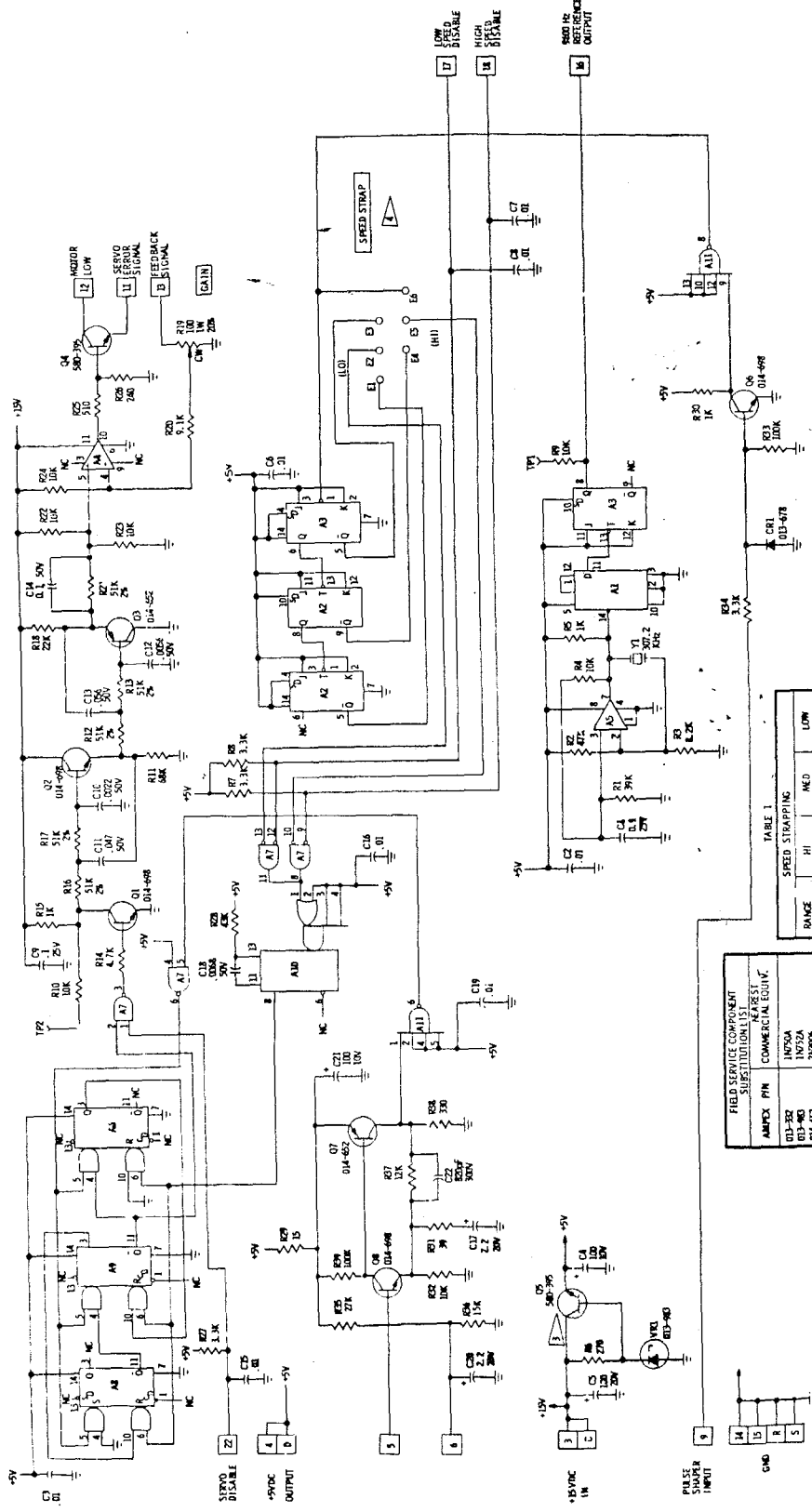


TABLE 1
SPEED STRAPPING

STRAP	HI	MED	LOW
E5 TO D5	E5 TO D5	E5 TO D5	E5 TO D5
E2 TO D2	E2 TO D2	E2 TO D2	E2 TO D2
E2 TO E1	E2 TO E1	E2 TO E1	E2 TO E1

FIELD SERVICE COMPONENT SUBSTITUTION LIST

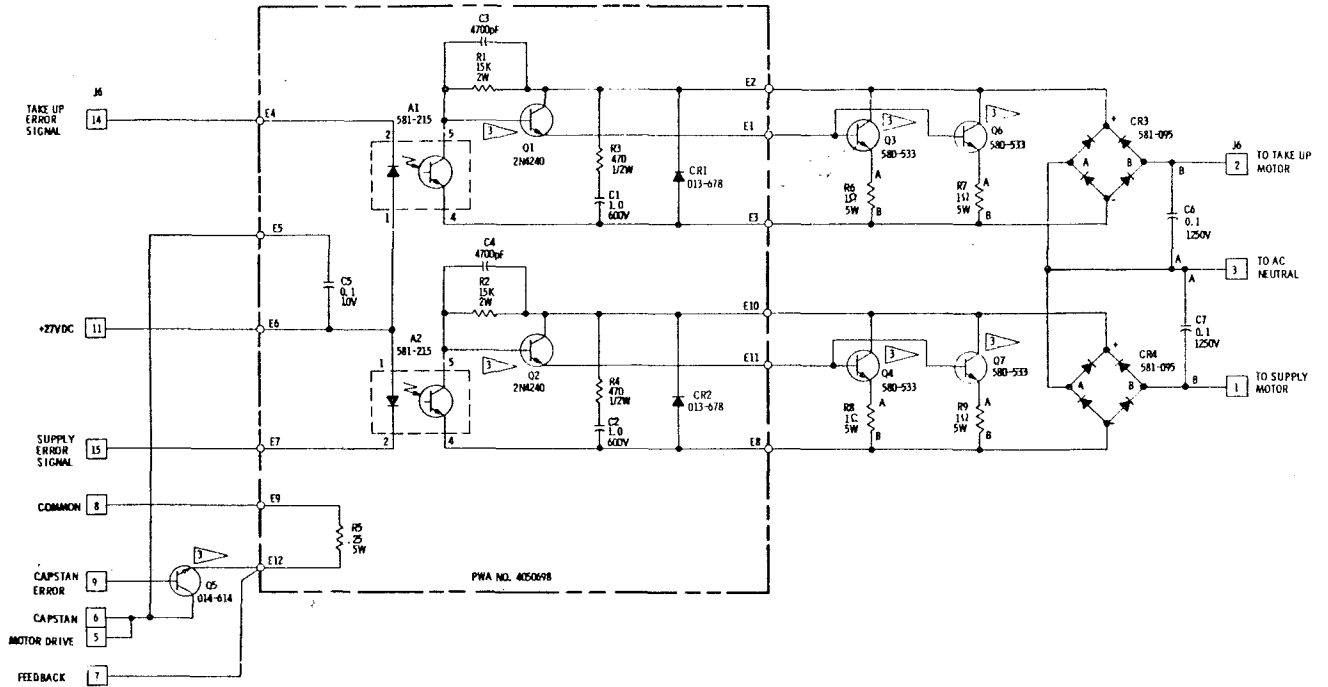
AMPX P/N	COMMERCIAL EQUIV.	NEAREST
013-82	1N750A	
013-80	1N72A	
014-82	2N5906	
500-96	2N6190	
013-87	1N235	

NOTES: UNLESS OTHERWISE SPECIFIED
 1. CAPACITANCE VALUES ARE IN MICROFARADS (100V)
 2. RESISTANCE VALUES ARE IN OHMS (1/4W, 5%)
 3. PULSED CURRENT REQUIRED

Sheet 1 of 1

4840356—
Capstan Servo

Ref. Assy: 4050692

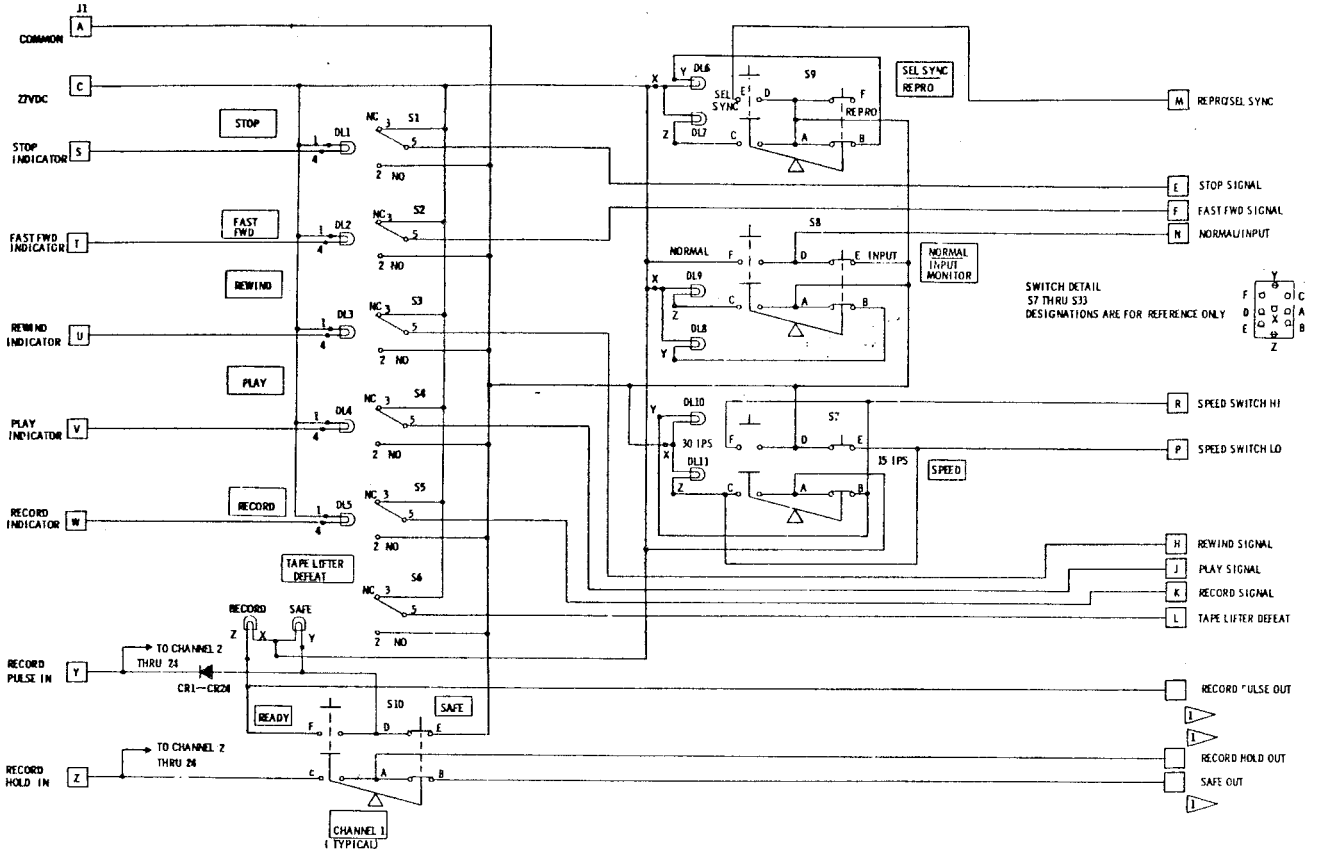


NOTES - UNLESS OTHERWISE SPECIFIED:
 1. CAPACITANCE VALUES ARE IN MICROFARADS.
 2. RESISTANCE VALUES ARE IN OHMS.
 3. HEAT SINK REQUIRED.

4840336—
 Motor Drive Amplifier

Sheet 1 of 1

Ref. Assy: 4050698



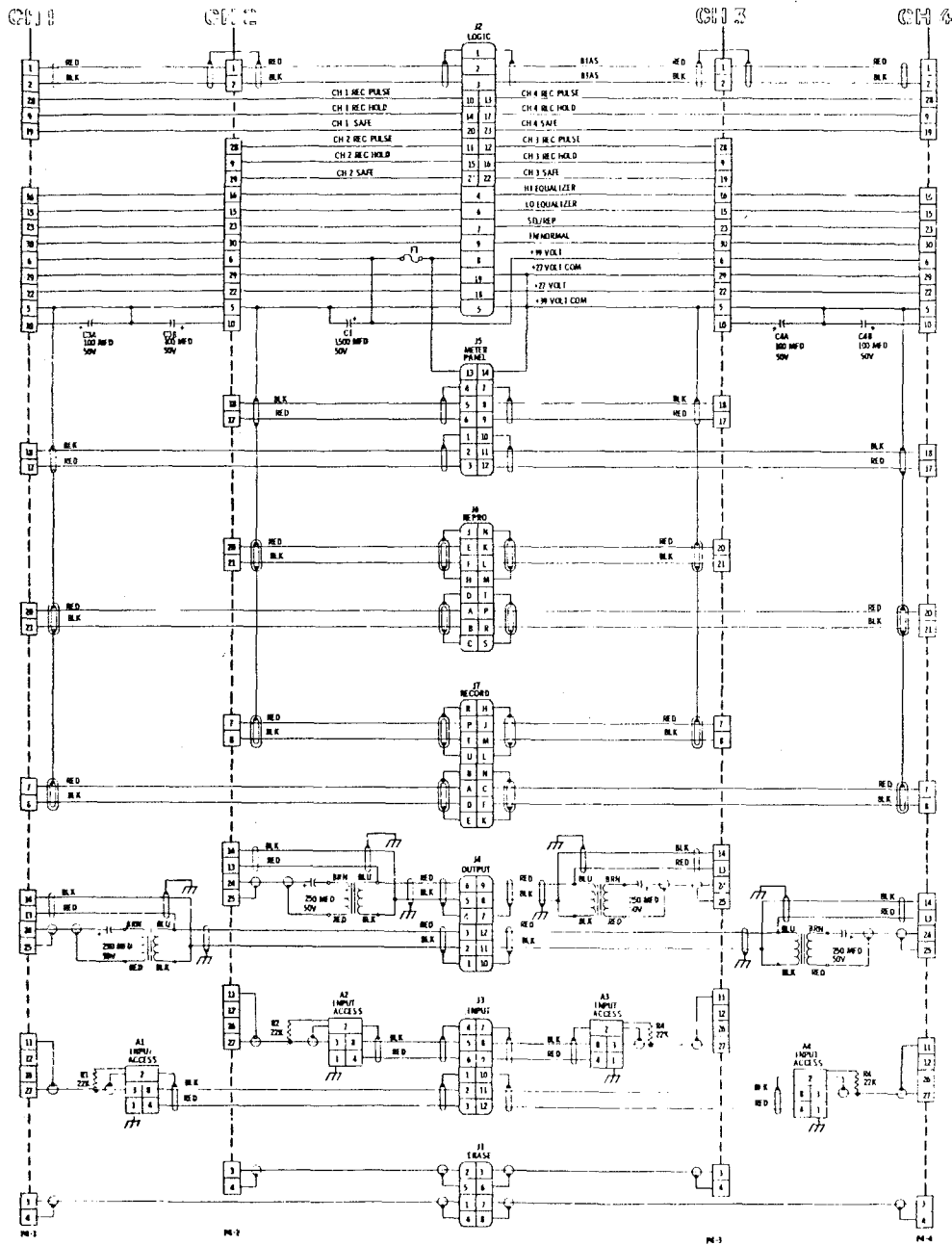
INDICATED PIN NO. ASSIGNMENTS CALLED OUT IN TABLE L

J1 CHANNEL NO.	PIN SWITCH NO.	ASSIGNMENTS		
		RECORD PULSE OUT	RECORD HOLD OUT	SAFE OUT
		PIN NO.	PIN NO.	PIN NO.
1	S10	a	AA	BA
2	S11	b	AB	BB
3	S12	c	AC	BC
4	S13	d	AD	BD
5	S14	e	AE	BE
6	S15	f	AF	BF
7	S16	g	AG	BG
8	S17	h	AH	BH
9	S18	i	AJ	BJ
10	S19	j	AK	BK
11	S20	k	AL	BL
12	S21	l	AM	BM
13	S22	m	AN	BN
14	S23	n	AO	BO
15	S24	o	AP	BP
16	S25	p	AQ	BQ
17	S26	q	AR	BR
18	S27	r	AS	BS
19	S28	s	AT	BT
20	S29	t	AU	BU
21	S30	u	AV	BV
22	S31	v	AW	BW
23	S32	w	AX	BX
24	S33	x	AY	BY
		y	AZ	BZ
		z	CA	CD
		aa	CB	CE

4840347—
Control Box

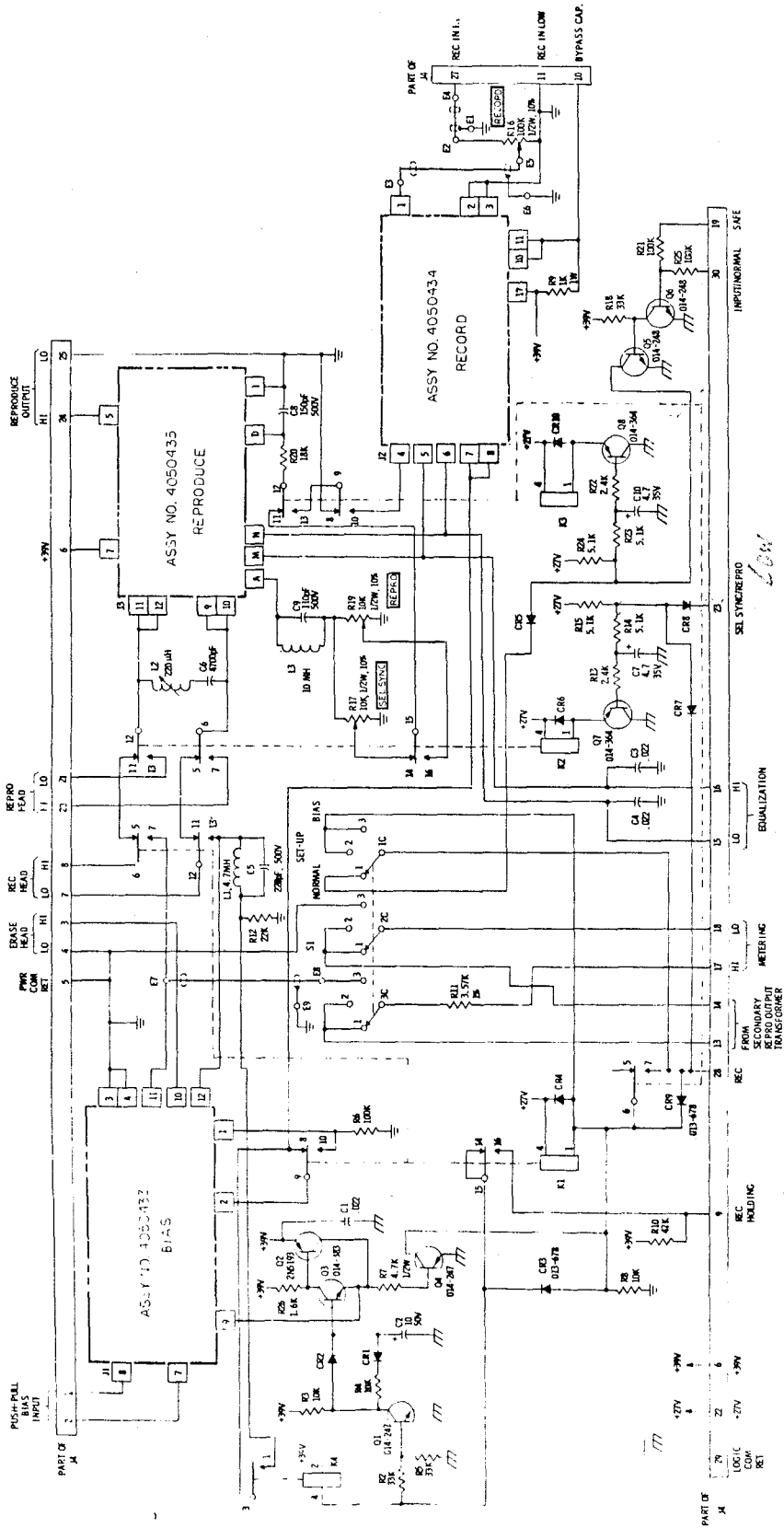
Sheet 1 of 1

Ref. Assy: 4050646



4840327—
Electronics Interconnect Diagram

Ref. Assy: 4020371



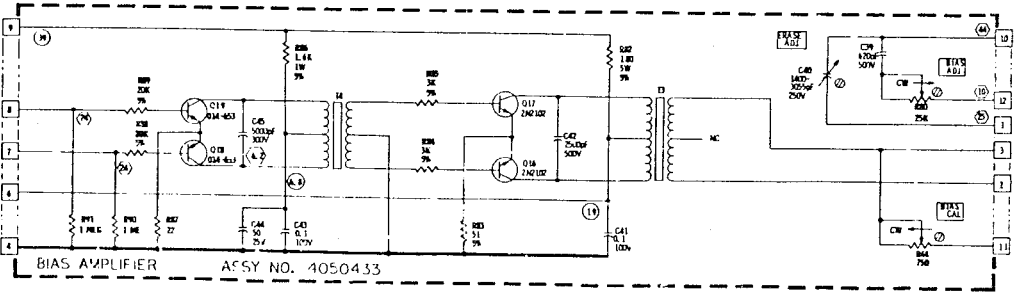
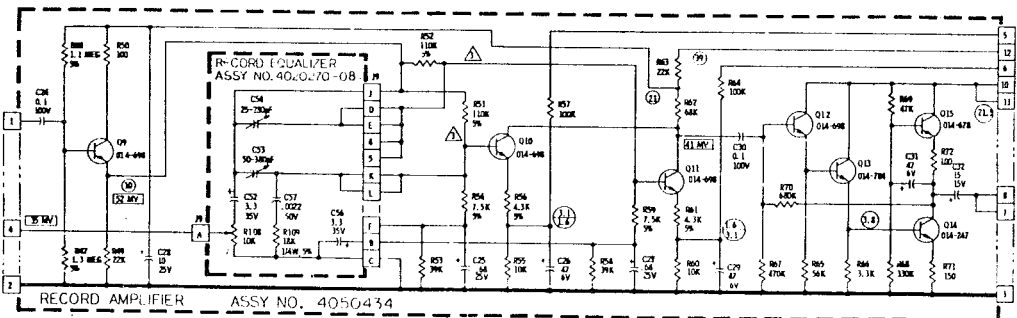
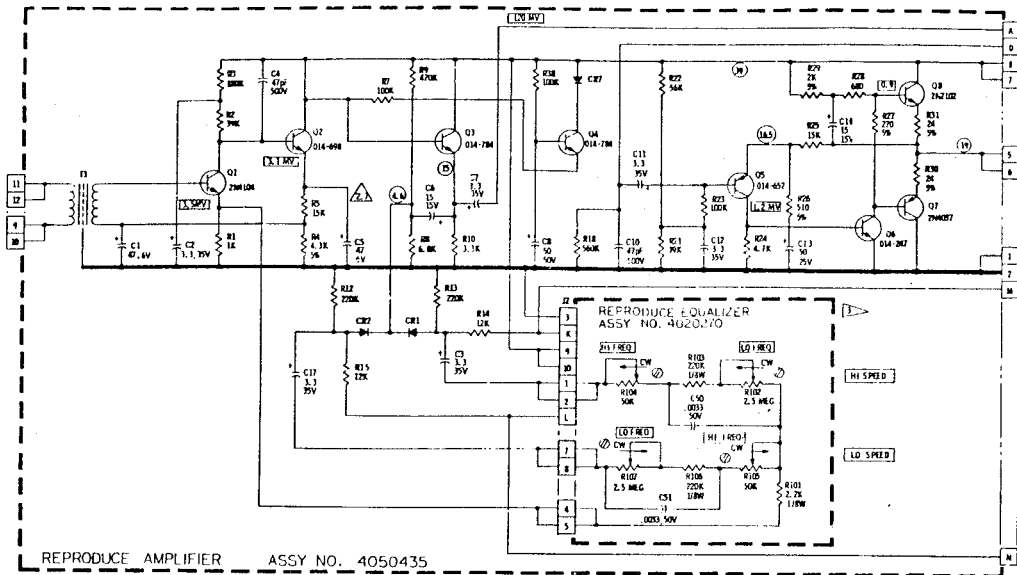
- NOTES: UNLESS OTHERWISE SPECIFIED
1. CAPACITANCE VALUES ARE IN MICROFARADS .001.
 2. DIODES ARE TYPE OD-599
 3. RESISTANCE VALUES ARE IN OHMS, UNLESS SHOWN OTHERWISE.
 4. LAST SCHEMATIC REVISION FOR 4050434-02 BOARD ASSY WAS:

Reproduce

Sheet 1 of 1

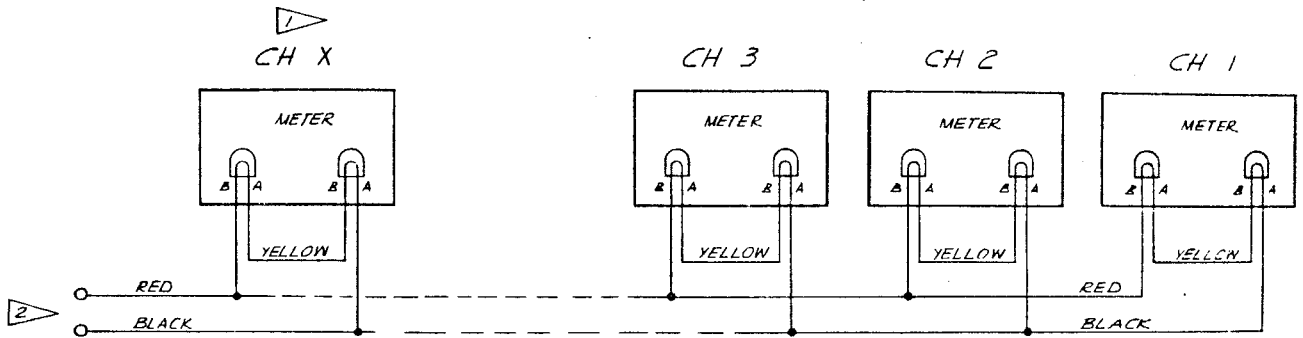
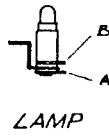
4840344--
Audio Switch

Ref. Assy: 4050690



- NOTES: UNLESS OTHERWISE SPECIFIED
1. CAPACITANCE VALUES ARE IN MICROFARADS
 2. DIODES ARE TYPE 013-998
 3. RESISTANCE EQUALIZER 4020370-08 CAN BE ADJUSTED TO MATCH A HORN OCCUR.
 4. RESISTANCE VALUES ARE IN OHMS 1/2W 10%
 5. (XX) INDICATES VOLTS D.C. MEASURED WITH A 20 000 OHM-VOLT METER.
 6. (X) INDICATES VOLTS D.C. MEASURED WITH A HIGH IMPEDANCE VTVM.
 7. (XXX) INDICATES VOLTS R.M.S. MEASURED WITH A HIGH IMPEDANCE VTVM AT OPERATING LEVEL OF 1000 Hz.
 8. (XX) INDICATES VOLTS R.M.S. MEASURED WITH A HIGH IMPEDANCE VTVM AT BIAS FREQUENCY.
 9. WIRE MESH DRAWING 68004 SCHEMATIC AUDIO SWITCHING.
 10. FIELD SERVICE COMPONENT SUBSTITUTION

REF. DES.	AMP/EX PIN	NEAREST COM. EQUIVALENT
CR1, CR2, CR7	013-509	14W4
Q6, Q14	014-267	7N2119
Q5	014-402	7N202B
Q18, Q19	014-403	7N210A
Q15	014-478	6X4
Q3, Q9, Q12	014-498	NONE
Q3, Q13	014-794	NONE



NOTES:

- 1 CHANNEL B, 16, OR 24
- 2 QUICK DISCONNECT TERMINALS
- 3. ALL WIRINGS ARE # 22 AWG.

4840366—
Meter Panel

Sheet 1 of 1

Ref. Assy: 4050707